

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Thirty-Ton Steam Hammer.

The demand for forgings of large dimensions for guns, shafts and machinery has been steadily growing in the last decade, aided by the advantages which the use of steel offers for such purposes. In conformity with these demands the size of the tool for hammering forgings of such weight and size has been increasing, until at present a limit seems to have been reached in the power of the railways to transport the products made by the construction of the great 80-ton steam hammer at Creusot. Foremost among the engineering firms who have built large steam hammers are Messrs. Thwaites & Carbutt, of Bradford, England, who have constructed the 25-ton hammer for the Alexandrowski Steel Works, near St. Petersburg, Russia, and one in use at the works of Sir William Armstrong & Co. at Elswick, the drawings of which are here reproduced from *Engineering*.

The main standards, it will be seen, are cast of two parts each, firmly bolted together; they are circular in section, taper slightly, and are inclined toward one another. They are 25 feet high, and as they have a clear span at the floor line of 19 feet 10 inches, there is ample space for the manipulation of the forgings. The guides, which are cast separately, are attached to the standards in a firm, unyielding manner. The entablature on which the cylinder rests at the same time connects the two standards to which it is bolted and wedged. By this arrangement and subdivision into several parts too ponderous castings are avoided, while at the same time the rigidity of the structure, which must be great in view of the violence and frequency of shocks, is not impaired. The steam cylinder, permitting a 12-foot stroke, is 4 feet in diameter; it is placed upon the entablature, making the entire height of the hammer 42 feet and 9 inches. The piston-rod is very massive and strong; it is firmly keyed to the 30-ton tup, which glides in slots of the guides by means of a projection. An attendant on the platform operates the valves through the agency of rods and levers within his reach. The hammer is, according to Prof. S. Jordan, served by two 20 and two 40 ton cranes, each of which is furnished with three hydraulic motions according to Armstrong's system. The heating is done in four Siemens gas furnaces. The Elswick hammer deserves careful study as a piece of work well proportioned and well executed. The frame, while it is strong and possesses the advantage of affording ample space, is built up of a reasonable amount of metal. The piston rod may appear excessively heavy while the tup is proportionately light; this however is a distribution of material which has many claims to consideration.

American Coal in Italy.

Mr. Spencer, our Consul at Genoa, in a letter to Mr. Hunter, says:

During the past quarter two cargoes of anthracite coal have been shipped to this port by a Philadelphia Company, with a view of opening up a market for American coals, and the experiment, which at one time seemed likely to prove a failure, has been attended with the most gratifying success. When this coal was first placed upon the market the highest price bid for it was only 22 francs per ton, an amount insufficient to cover the freight from New York. Subsequently, however, on its becoming known that it was well adapted to smelting purposes, the price at once advanced to 40 francs per ton, which covers original cost and freight and leaves a fair margin for profits.

Heretofore English coke, which is selling at 60 francs per ton, has been used almost exclusively by Italian iron founders, but as the American anthracite, after repeated experiments, gives equal, if not superior, results, there seems to be no reason why it should not supersede its English rival in the Italian market. It appears from reliable information that the amount of English coke consumed in the Mediterranean basin is over 200,000 tons annually, to say nothing of other European ports. For this trade the American anthracite bids fair to become a successful competitor, thereby furnishing a much-coveted outlet for the surplus production of our immense coal fields, and at the same time giving employment to hundreds of vessels in our languishing mercantile marine.

Col. John W. Forney writes on the same subject from France as follows: In a long and interesting conversation with my old friend O. M. Spencer, Esq., for twelve years American Consul at Genoa, I find that considerable excitement has been produced in Italy by the arrival of this new article of fuel. Mr. Spencer is in high spirits that our Pennsylvania anthracite will find a great sale, with proper effort, all over the Continent for smelting purposes. The English soft coal holds the market at about 60 francs a ton, while about 40 francs will pay for our anthracite, including the costs of transportation to Genoa. Most of the iron introduced into Italy is from England and Wales, and the late trials at Genoa of our Pennsylvania anthracite have produced a better iron for all the purposes in which iron is used in Italy. I need not theorize on a subject so familiar to the ironmasters of Pennsylvania as the superiority of anthracite in the manufacture of the best iron. That which is

most important to the owners of our collieries, to miners and to shippers, is the fact that all the Continental nations can procure our anthracite as cheap as and cheaper than the English bitumens, and that the anthracite is better for smelting purposes. The enterprise of Torrence & Co. deserves special commendation. The bark *Avanell* is a New York vessel, but the trade of which it is the pioneer can be cheaper done in Philadelphia shiptrading directly to the Continental ports, and may in the end, and sooner than we expect, lead to the formation of special lines from our city, as more than once advocated by Italian visitors to the United States, and steadily by our American officials abroad.

"the balance of trade" will need no tariff to adjust it. Your experiment in opening a new commerce with Brazil and the recent revival of work in all our shipyards, prove that the substantial relief from hard times is not so much in high tariffs, as we contend, or in free trade, as the English insist, but in finding new places in which to sell our surplus materials—or in the exchange of the works of nations, by such a policy as that started by a Philadelphia house, and at present a topic of much conversation among Americans and Frenchmen at the Exhibition. The intelligence of the formal and favorable introduction into Italy of so important and exclusive a staple as anthracite

time, receive from 40 cents to 50 cents per day without board.

The family of a laboring man, consisting of himself, wife and three children, can live very comfortably on \$21.4 per annum; therefore, with steady work, such a man can make both ends meet. In most cases the wife and older children contribute to the general support by performing other work. Such work is to be found in abundance in Brunswick.

In regard to German monetary affairs, I beg to say that the German Reichs Bank has the privilege of issuing about \$64,000,000 more bank notes than she has coin in her vaults; should the circulation of these

arms, led the laborer to believe that his position would henceforth be one of ease and affluence, and therefore accustomed himself to indulge in various luxuries previously unknown. In 1874 when the grand reaction came exchange turned against Germany; her industries declining, wages of course declined in proportion, and working time was increased. The workman then was in a worse condition than ever before, and becoming disgusted and discontented would not work.

Illegal Currency.

Some time ago the Bangor (Mich.) Furnace Company issued checks or orders of the following tenor:

"The Bangor Furnace Company will pay the bearer on demand 50 cents in goods at their store in Bangor, Mich."

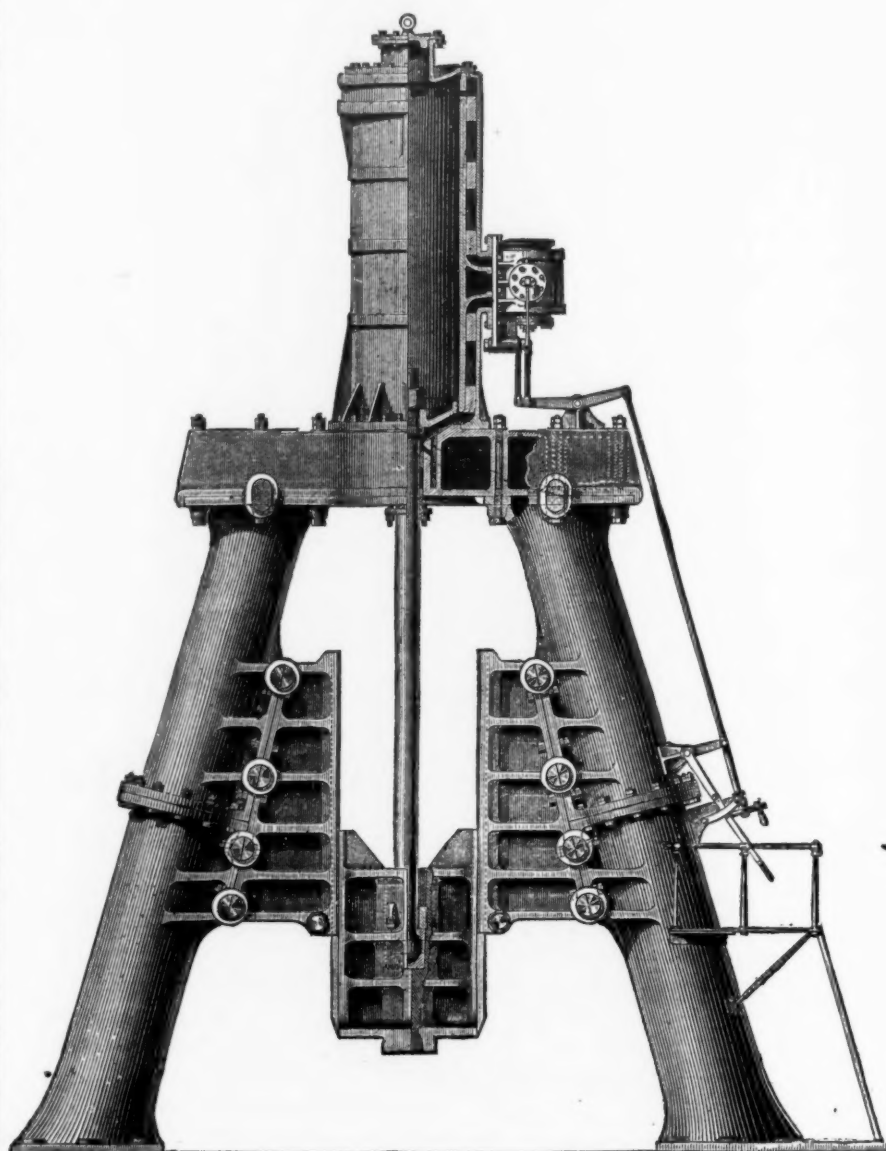
Somebody prosecuted them for issuing these promises, alleging that it was in violation of the law; but the U. S. Supreme Court decided that "the instrument not being payable in lawful money, the issue and circulation thereof were not in violation of the act in question."

A similar case has just been put upon the docket of the United States Circuit Court, and this is also "out West." The Cairo and St. Louis Railroad Company have been in the habit of issuing 25-cent checks, four on a slip, to be used as meal tickets by the employees when they were on the road, the hotel or boarding-house keeper accepting the checks as money and afterward getting them cashed by the company. The United States District Attorney claims to be able to prove that the company circulated the 25-cent checks as actual money; that the employees were paid off, sometimes partly and sometimes wholly, in them, and that a number of storekeepers and pawnbrokers took them at a considerable discount. The front of each ticket stated that it "is good for 25 cents, payable at the time and when all conditions written upon the back are complied with." The conditions on the back referred to were: "This ticket is only to be used by an employee of this company for meals and lodgings, and the person receiving it does so with the understanding that the company will refuse payment if used for any other purpose, and will only make payment when presented therefor at the office of the company at St. Louis, Mo., when the rolls of the company are being paid for the month named above."

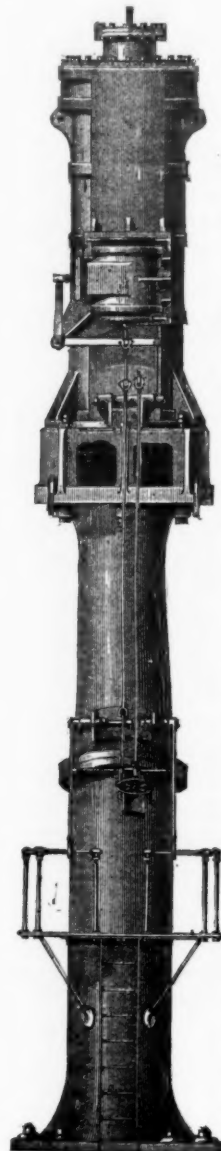
Though somewhat similar to the Bangor case to which we have referred, Judge Treat refused to quash the indictment and ordered the case tried. It has not yet been reached.

American Enterprise in Chili.—The *El Mercurio del Vapor*, under date Valparaiso, May 1, issues an eight-column article, the substance of which is that the La Segua Gold Mining Company, organized under the laws of the State of New York, has built a canal 12 miles in length, and is building a reservoir 800 feet broad and 75 feet high, which, when completed, will afford an ample supply of water to wash the gold-bearing gravel by the hydraulic machinery—such as is used in California, and which is the first to be employed in South America. The supply of water in the canal now employed is sufficient during the rainy season, and when the reservoir is completed the hydraulic machinery will be constantly in operation day and night. Five hundred men are now employed in building the reservoir. The most competent engineers declare that \$1,000,000 can be realized yearly, and the six hills, being the deposits of an ancient river, cannot be washed away in a hundred years. This mine has been worked for a hundred years or more by the natives in their crude way, but a thousand could not obtain as much in a year as can be realized in ten days by the hydraulic system. Mr. John Simpson, the mining engineer from San Francisco, Dr. A. P. Burns, of Maryland, is general superintendent at the mine and Mr. John H. Flagler, of New York, is the president of the company. The latter is the man who put the iron pipes over the Nevada Mountains for Flood & O'Brien which supply the water for the Bonanza mines.

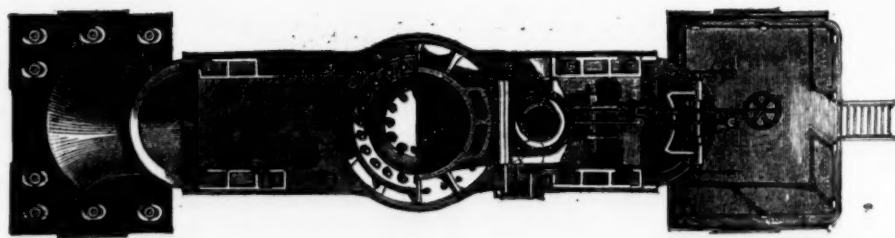
The *Railway World* says in a recent article on bridges that the iron for such structures needs especial care and judgment from the time the ore is selected at the mine until it passes through the last roll at the mill. Before the iron is used, its tensile and compressive strength should be well known, and the cold bend test applied. In a Howe truss bridge of 107 feet span, built seven years ago, one of the truss rods had dropped through the angle block into the water below, leaving the nut and a portion of the rod upon the top chord, the point of fracture being immediately below the nut. This rod and portions of other rods in the bridge were tested, and found not to be of uniform quality—a portion of the rod would break over the anvil, not unlike cast iron, while other parts of the same rod would stand an excellent cold bend test. On the same road, within six miles, was another Howe truss bridge of 112 feet span. The rods in this bridge had been in use for 16 years, and there was not a piece of iron in the structure that would not stand the cold bend test. The iron of both these bridges, when placed in the hydraulic press, showed the same tensile strength, averaging about 48,000 pounds to the section of a square inch.



Front Elevation.



Side Elevation.



Plan.

THIRTY-TON STEAM HAMMER FOR SIR W. ARMSTRONG & CO.'S WORKS, ELWSICK.

English coke is now selling at Genoa for 60 francs per ton, and as Pennsylvania anthracite is decided to be better for smelting purposes, and can be placed on the Italian wharves for 40 francs, you can anticipate the profit even in the midst of a vigorous competition. In regard to the return cargoes, that point was settled long ago. The only difficulty was to secure cheap freights from the United States, or such American products as might be used here, in exchange for Italian marbles, pictures, sculptures, rags, &c., for which there is a constant demand in our country. You can study the value of American commerce to Italy as you traverse the Italian section. Our petroleum and sewing machines are for sale all over the Continent, and immensely in Italy, Germany, Switzerland, Spain and the further East, and although our agricultural implements have not yet superseded, as they will, the primitive machinery still in use on the Continental farms, they must find speedy sale as our communications with these countries are increased. Add a constant market for our anthracite coal, and we shall not be long before

coal, now at the lowest point of depression and production, marks a new era in our history, and may be set down as one of the most substantial triumphs of the Philadelphia Centennial and the French Exhibition combined.

Wages and Currency in Brunswick, Germany.

Mr. W. C. Fox, our Consul at Brunswick, Germany, writes as follows concerning the wages of workmen in his district:

Mechanics and skilled laborers of all kinds receive from 48 cents to 76 cents per day, without board.

Ordinary laborers, including farm and field hands, receive from 35 cents to 50 cents per day, without board. In the country the custom is to pay more in land products than in cash, similar to the American "on share" plan. To these two classes belong those only who are employed by the day.

Railway hands, laborers on public works and all such as are employed for a period of

notes exceed the amount of coin by more than the above-named sum the bank must pay a yearly tax of 5 per cent. on the surplus.

The bank of Hanover can issue \$1,400,000, the bank of Brunswick about \$750,000 on the same conditions. At the last statement the Reichs Bank had \$19,000,000, the bank of Hanover \$750,000 and the bank of Brunswick \$350,000 of notes uncovered by coin in circulation. Paper money is equal in value to coin, since it is at all times redeemable in coin.

Trade in general is very dull all over Germany, and in this consular district especially. Work, however, of many kinds is readily to be obtained: the great trouble seems to be that workmen will not work at present prices or at such work as is to be had.

So far as I am able to learn the Social Democratic party is largely responsible for the state of things. The rapid increase of the German industry since 1866, and more especially in 1871 and 1872, had a most extraordinary influence on wages. This, coupled with the success of the German

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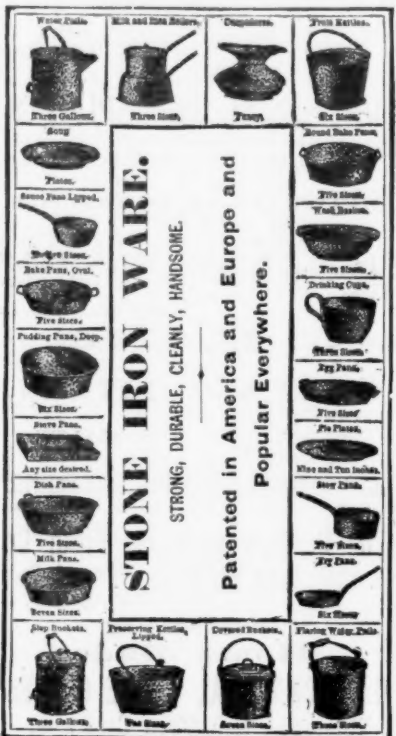


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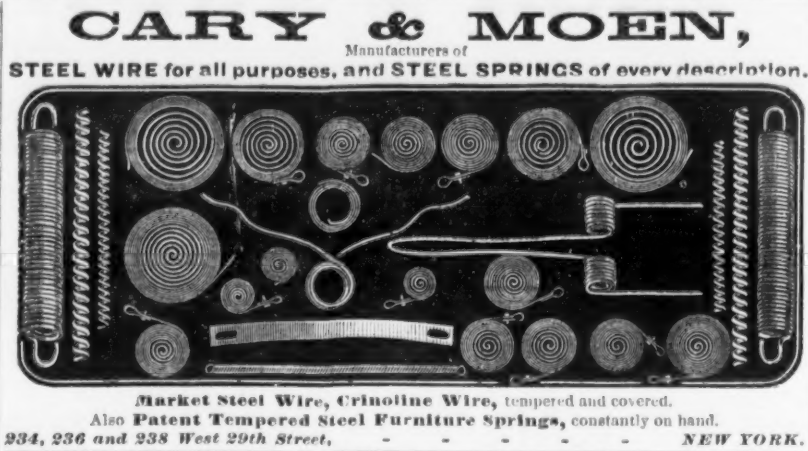


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Ivory.

The following information concerning ivory, which we take from the Boston Commercial Bulletin, will be of interest to cutlery manufacturers and other consumers:

In the strictest sense no substance except the tusk of the elephant presents the characteristics of true ivory, which, according to the best anatomists and physiologists, is restricted to that modification of dentine, or tooth-substance, which, in transverse sections or fractures, shows lines of different colors, proceeding in the arc of a circle and forming, by their decussations, minute curvilinear, lozenge-shaped spaces, known as the "grain" of ivory. In ivory there is more mineral matter than in bone, but it has still a definite animal basis which retains its form when the calcareous matter has been removed by maceration in acid. It would be a most interesting task to trace the history of a tooth or tusk from its primitive embryonic dental capsule, through all its stages of formation and growth, until it arrived at the perfect tooth—the perfect tusk. Such a line of study would be well worthy of pursuit and would amply repay the time and attention given to it.

Ivory is derived from the elephants of Africa and Asia, and also the mammoth remains on the northeast coast of Siberia. It is obtained from the hippopotamus, walrus, or moose, the boar of India and the whale. Large quantities of each kind of ivory are imported into this country, and of considerable value as an article of commerce. During the last thirty years the quantity of ivory brought into this country annually has been doubled, and, at the present time, such is the demand for ivory that the market value has also been doubled during that period. Africa is still, as it ever has been from the earliest times, the great source of the supplies of ivory to the rest of the world. Although ivory is obtained from the Asiatic elephant kept in a tame state in Siam and Ceylon, yet, still, the great storehouse for it is Africa. All medium sized tusks of Zanzibar ivory are sought after and bought up for India, and hence it is that so great a proportion of the ivory brought from that coast to England and America is defective—in fact, we only get the rejected tusks. To those interested in the matter of billiard balls, it may be worth while to mention that for balls $2\frac{3}{4}$ or $2\frac{1}{2}$ inches in diameter the most solid and valuable samples of ivory are used. Other kinds of ivory are worth, on the average, \$50 per cwt. That from which billiard balls are made is worth \$70 to \$80 per cwt. The need of their being made out of the best part of the tusk is accounted for in this way: a billiard ball should be without bias, i. e., no tendency to move in one direction more than another. It has been found that the center of the solid part of a tusk is more dense than the outer part, or skin, and hence the need of making the ball out of that part of the tusk where the density is equally spread, so that the ball, when made, may run freely every way. A very ingenious machine is used in making such balls; a block of ivory is dropped in at one part, the machine being at work, and the ball comes out at another part completely spherical.

The mode of collecting ivory on the Continent appears to have been the same from the earliest times of which there are any records. Evidence of this can be had from the sacred writings of the Jews in the Old Testament Scriptures; the accounts given by Herodotus, the oldest Greek historian, and the narratives of the most recent travelers in Africa—such as Baker, Cameron, Livingstone and Stanley. They all show that the trade in ivory was carried on for centuries before our era, much as it is at the present day. Pliny, in his natural history, states that in his time (70 A. D.) the natives made door-posts of the tusks, and even fences and stalls for their cattle, much as they do now; and the graves of their great men, or heroes, were then, as at present, ornamented with bristling rows of elephant tusks, very suggestive of a sea-anemone on a gigantic scale, any single tusk of which might be worth from \$50 to \$70. Sometimes, when a tusk is found to be what is termed "benny," it could be seen that the point of it, from frequent friction and rubbing, quite worn away and flat. This abnormal condition was also found in the pulp or contents of the hollow cavity, and then it assumed some very grotesque forms. It has been thought that the presence of a bullet or some foreign substance fired into the tusk at its root has set up a condition which has resulted in the so-called "bean disease." Instances have been known where a shot entered the root of a tusk at its soft part in a young elephant and gradually traversed the whole length of the tusk and finally dropped out at the end of it. Silver and gold bullets have been found in tusks, which is evidence of their having been fired by "royal hands."

The presence of elephant remains in the frigid zone is a most interesting subject of inquiry, and on which much has been said, but concerning which no entirely satisfactory conclusion has been arrived at. The form of the mammoth tusk is different to that of the existing elephant; the minute structure also differs in some respects. It has been found that when this kind of ivory is manufactured into knife handles, or piano-forte keys, it looks well for a time, but at the end of two or three months the surface is covered over by a thin film of lime; and, instead of the fine, bright, appearance, the ivory assumes a dull, dead look.

Vegetable ivory is the hardened kernel of the nut of a species of palm, of which there are several kinds. The Brazilian palm (*Phytelphas Macrocarpus*) grows freely in Central America and Peru, and yields what is known as the corosos nut of commerce. When shipped, the kernels are quite milky and soft, like white wax, and during the voyage they ripen and become hard. The nut is chiefly used for making buttons, studs and other small articles.

Fictile ivory consists of casts of plaster of Paris well dried, and made to absorb, by capillary attraction, a fluid composition of white wax, spermaceti and stearine. Very good reproductions of ivory carvings are made in this material.

Ivory, though an animal substance, is as enduring as marble, and being a very beau-

tiful material, must very early have attracted notice for the purposes of art. There are ivory productions of prehistoric man in existence with figures and outlines engraved on them. We have lately heard much that was of interest about our old friend, the "pre-historic man," and from the amount of attention he has received, he has come to be a very important personage in the world's history. He has left his marks, if not his name, on certain veritable pieces of ivory, the antiquity of which has been placed beyond doubt or cavil. One of these was incised or cut in the likeness of the mammoth, with which race of mammals our friend was coeval. This specimen might be regarded as the oldest work of art in ivory hitherto found without a date. The most ancient works, and those whose date or age could be found, were obtained from Egypt, and they often took the form of tablets carved with figures and hieroglyphics from which could be ascertained the age and date of the work. There is one such tablet in the British Museum, and in the Louvre, Paris, is a small ivory box with the name on it of a dynasty anterior to the exodus of the Jews, so that it is not beyond the range of possibility that such a box might have been in the hands of Moses or Joseph. In Assyria and Nineveh ivory was extensively used, and the researches of Layard, Bonomi and Smith brought many remarkable objects to light, which are now in England.

There were notices of works in ivory in all ancient writings before the Christian era. The Hebrew scriptures frequently allude to such; so do the writings of Hesiod, Homer, Herodotus and others. The frequent allusions to ivory palaces, ivory thrones, ivory beds, pointed to a wide and extensive use of the material, not only for small articles, but for the construction and ornamentation of works on a large scale. Among the ancient Greeks, who carried the arts to the highest point of excellence, ivory was used in combination with gold, commonly known as chryselephantine. Phidias, the great sculptor, was employed in making the famous statues of Minerva for the Parthenon at Athens, and of Jupiter for Olympia. The statue of Minerva was 40 feet high and that of Jupiter more than 50 feet. The faces and uncovered parts of those statues were made of large plates of ivory carefully joined. Some of the Greek chryselephantine statues remained intact until the 7th and 8th centuries, at which period the spirit of image-breaking set in, when they were irretrievably destroyed. It is thought that the ancients had a method of softening their ivory so as to be able to bend it into large flat plaques. But that method, like others the Greeks possessed, must now be enumerated among what Mr. Phillips has described as the "lost arts." Some of the old ivory carvings, originally heathen, have undergone a transforming operation, and, by the carver's skill, have been altered to Christian sentiments. In this way the figure of a goddess has been converted to a saint, and the effigy of a deified Roman emperor has been made into the figure of an apostle.

There was one use of ivory among the early Christians not often alluded to. In the early church it was customary at the end of public meeting to exchange the "kiss of peace." This practice was, however, found to be attended with some inconvenience, because the osculations were not always devout—not always even platonic. So a flat piece of ivory was directed to be used for this purpose and handed round instead of the old practice of salutation. Whether the change from the warm cheek of youth and beauty to the coldness of an ivory slab was a change for the better might be very well left to the thoughts of those whom it concerned. Anyway, all further scandal ceased, and that, we might suppose, was the intention in the change introduced.

Ivory workers are necessarily very economical in using their material. Nothing of the article is wasted; small, clean pieces and shavings are reduced to a gelatinous state and form excellent size; the dust and discolored scraps are collected, to be converted into the valuable pigment known as ivory black, by the process of calcining in metal retorts.

The Art of Molding.—At a meeting of the King's College Engineering Society, Mr. E. W. Anderson read a paper on this subject. He gave the following general rules to guide the molder in the running-in of the metal in molding: 1. Choose, if possible, the thickest part of the casting for the runner. 2. If the casting is deep, run in the metal at the bottom. 3. Where the casting has a flange in the form of a pipe it is generally preferred to run the metal in at the flange; but this case is subject to rule 6. 4. When the casting is thin, and has many branches, or when it is of great length, it is advisable to run in the metal in the center. 5. Care should be taken to choose a place in the mold so that the metal will have no tendency to wash any part away in its first rush. 6. (This rule may be called a continuation of No. 5). The metal should not be allowed to fall from any height upon a weak part of the mold, or it will be liable to break down portions thereof.

The sale of German hardware is gaining ground in Great Britain. A Sheffield correspondent writes that he was shown, in the warehouse of a leading Sheffield merchant and manufacturer, samples of tailors' scissors which were quite equal to those made in Sheffield. This is an important branch of the scissors trade, and was for many years monopolized by Sheffield makers. The difference in prices are astounding. The Sheffield-made tailors' scissors cost 18/-; the German article, similar in size and equal in quality, costs only 7/3. They look well, cut well, and, we are informed, wear well. Does this speak well for England's trade unions, with their obnoxious restrictions? As the organ of the hardware trades, we regret that the backbone of England, viz., her workmen, should be so stupid in their demands as to cause their employers to be beaten in the market like this by our German competitors. The masters have been to blame at times; but when they have come to the front and laid down expensive machinery they have frequently found themselves checkmated by the very workmen who are now reaping, in comparative poverty, the fruits of their folly.—Ironmonger.

Iron.

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Pumps & Boilers, Copper, Brass,
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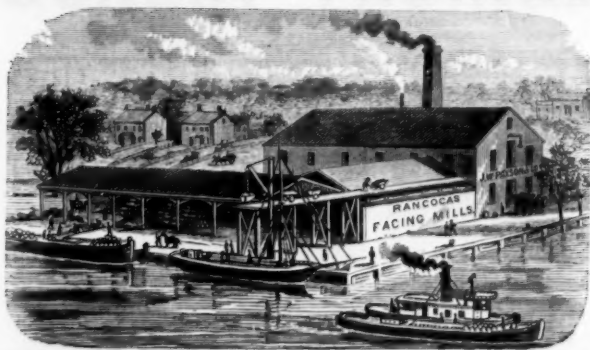
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Iron, Steels, Limestone, Clays,
Slags and Coal for Practical
Metallurgical Purposes.****No. 339 Walnut St., Philadelphia.****J. BLODGET BRITTON.**This laboratory was established in 1866, at the in-
stance of a number of practical Iron Masters, ex-
pressly to afford prompt and reliable information
upon the chemical composition of the substances
above mentioned, for smelting and refining pur-
poses. The object being to make it at once a con-
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expensive adjunct to the Furnace, Forge and Rolling
Mill.**CHARGES TO IRON WORKS.**For determining the per cent. of Pure Iron in
an ordinary Ore.....\$4.00
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For each additional constituent of usual oc-
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Being Sole Agents for Messrs. Smith Bros., OWNERS OF
THE MINE, we are enabled to sell at the lowest prices.
WM. T. COLEMAN & CO.,
NEW YORK, 180 Pearl Street.
SAN FRANCISCO, CAL., 607 California and Front Sts.**Iron Making in Western New York.**The Buffalo Courier says: In 1861 the
old Pioneer blast furnace was erected by
George Palmer in the eastern part of the
city, on Buffalo Creek, and this was the
starting point in the production of pig iron
here. This stack is now one of the three
blast furnaces owned by the Union Iron
Company. In 1862 Mr. Charles Wadsworth
built a rolling mill alongside of the furnace
for the purpose of converting the pig iron
made there into wrought or bar iron. From
time to time various additions were made,
until now the Union Iron Company, which
owns the entire property, has one of the
most extensive establishments in the United
States for making pig iron, iron rails, beams,
plates, and the various forms of angle and
bar iron. In 1863 Pratt & Co. built the
Fletcher furnace at North Buffalo, and
since it began to run out pig iron in April,
1864, its glowing top has never ceased to
serve as a well-known beacon light on the
Niagara River, except during occasional
short intervals for necessary repairs. Pratt
& Co.'s rolling mill was built over 20 years
ago, and it has frequently been enlarged and
improved.The Lily Furnace at Ironton, although
about 10 miles from the city down the Ni-
agara River, should be included in the district,
as it is owned in this city and is the only
furnace outside of Buffalo which makes
pig iron with anthracite coal from Lake
Superior ores. This furnace was completed
in the fall of 1873 and ran about one year,
after which it was "blown out" and has
since been idle.It is said to be the most elaborately fin-
ished furnace in the world, all of its appoint-
ments being of the best material and finish,
and everything being constructed with a
view to permanent durability. The stack is
60x16, resting on iron column and cased in
boiler iron. The engine house (which was
described in one of the London papers as
elegant enough for the residence of a gentle-
man having a large income) contains besides
the usual pumps two immense blowing en-
gines, each of which is about 40 feet in
total height, and has a stroke of seven feet,
the steam cylinder being 54 inches in diam-
eter and the air cylinder 96 inches. Each
engine has two fly wheels, each 24 feet in
diameter and 20 tons in weight.Without going into any details of con-
struction we would simply say that all the
arrangements were made with a view to
constructing two furnaces, and everything
is in place for the second, except the stack
itself. The works are most advantageously
situated and arranged with a view to good
and economical production, so that any
assured revival in the iron trade will see the
works completed and in full operation. It is
most unfortunate that out of the five blast
furnaces mentioned but one (the Fletcher)
is now running, but in this respect Buffalo
is not far behind the iron trade generally,
and if the same proportions were observed
everywhere, the market would not be so
completely broken down by the overproduc-
tion which has carried prices below any pos-
sible margin of profit, except in isolated
cases. With the present low rail freights
and the ruinous competition now going on in
the Pennsylvania and Ohio Iron districts, pig
iron can be laid down here for just about
what it would cost to make it, the small
margin not being enough to cover the risks
of manufacture and the contingencies of
trade. In ordinary times the five furnaces
here would not produce enough to employ
the local demand, so that it is evident that
if iron can be made here now with prices at
the lowest point they have ever reached in
this market, no very great advance in
prices would be necessary to induce all the
furnaces to blow in.Cheap coke is the one thing needed to re-
nder iron-making profitable here now. An-
thracite has always been used, and its com-
bination at this point with the rich and pure
ore of Lake Superior has given the iron
made a very high reputation for foundry and
mill purposes, but the high cost of fuel and
the violent fluctuations in price have pre-
vented our iron trade from expanding as it
has at other places. Give Buffalo a pure
coke at prices somewhere near Pittsburgh
rates, and it will produce first-class red-short
or neutral iron at prices that cannot be
beaten anywhere, taking into consideration
the local market and the cheap freights
offering for distribution in all directions. If
some of the many coal companies now losing
money by selling the product of their mines
at cost, or below, would make for this mar-
ket a clean, washed, hard coke it would
have a large sale, and would be in great de-
mand for furnace and foundry use, provid-
ing, of course, that it could be sold at a
moderate price. The blast furnaces alone
could take at least 25 car loads a day. We
have reached a pretty low range of prices
for bituminous coals, perhaps as low as we
can expect to get with the present modes of
transportation, but coke is still expensive
because it has to be carried so far by rail,
although it might be made much nearer
home. It is not likely that either anthracite
or ores will ever be much cheaper than at
present, so that a reduction in the existing
cost of production must come from using
other fuel. In regard to its ore supply Buf-
falo is peculiarly favorably situated. Lake
Superior ore can be delivered directly to the
furnaces almost as cheaply as it can be
placed on the docks at Cleveland, the great
distributing point for that ore. No 1 ores
can be laid down here now for \$6, and other
grades in proportion. This is less than half
the price in 1873. The rich magnetic ores
of Lake Champlain can be delivered here
by canal at a very low price, and across the
line in Canada are immense beds of rich,
pure ores which can be delivered for \$4 a
ton. For mixtures mill cinder and New
York State ores are cheap and abundant.
Good limestone for flux costs about \$1.25 a
ton. At these rates it costs to make a ton
of the best iron between \$17 and \$18. As
more than one-third of this is for fuel, that
affords the best chance for possible reduc-
tion. From present indications it is not
probable that any of the furnaces now idle
will be blown in during the present year;
this necessarily involves their remaining cold
until after the opening of navigation for the
season of 1879, by which time it is to be
hoped that operations will be resumed at allthe works. It is a great loss to the city as
well as to the owners, to have all the fur-
naces and the rolling mills of the Union Iron
Company idle. When in full blast these
works give employment to over 1000 men;
to them the shutting down last year was a
serious matter, and the resumption of work
will be a subject for general rejoicing. Pratt
& Co.'s mill still keeps in active operation,
as usual.**Utilizing Niagara.**The Buffalo Commercial says: Some
months ago the Commercial described a
series of experiments made in this city with
the view of demonstrating the practicability
of using the immense water-power at Ni-
agara Falls for transmitting power to this
city through the agency of compressed air.
As announced at the time, the experiments
were sufficiently successful to convince sev-
eral of our enterprising citizens that the
scheme was entirely feasible. A company
has since been formed, of which Senator
Pierce is president, considerable capital has
been paid in, and practical operations have
been begun.The principal part of the machinery will
be near the water's edge, below the falls
near that delightful spot called the Bridal
Veil. The rest will be on the bank immedi-
ately above. The great air receptacles,
three of which will be 70 feet long by 6 feet
in diameter, will be below the bank, near
the water, while the receiving reservoirs
will be on the bank. The cylinders will be
constructed of boiler iron in the most sub-
stantial manner. The perpendicular fall
from the feeding basin above to the air re-
ceptacles below is 214 feet. The engineer's
figures show that 200,000 pounds of iron will
be required, and it is estimated that power
enough will be generated to raise about 350,-
000 gallons of water 150 feet every minute.
These results have been obtained by careful
scientific tests, so that there is little doubt
but they are nearly correct.Gentlemen prominently connected with
this enterprise own Day's Canal, which, it
will be remembered, was constructed sev-
eral years ago by Mr. Day for water-power
purposes, at an expense of nearly \$1,000,000.
This canal will play an important part in
connection with the new project. It is 33
feet wide by 11 feet deep, and leads from a
point just above the rapids a mile across to
the back below. At its lower end is a large
basin 70 feet wide and 800 feet long and 11
feet in depth. From the basin a flume 300
feet long is digging to the edge of the precip-
ice. At the mouth of the flume will be a
massive iron gate with an 8-foot opening.
The water from the flume will pass into the
reservoir, which will be connected with the
air receptacles below by means of large pipes
syphon-shaped. Attached to the cylinders
will be a requisite number of large automatic
valves, to let the water run out of the cylin-
ders after the compressed air has been al-
lowed to escape. The practical working of
the machinery will be briefly as follows:
After the water in the reservoir on the top
of the bank is high enough to reach the bend
of the syphon it will escape down the pipe
to the air cylinders below. The pressure
thus obtained very soon closes the automatic
valves. There being no escape for the water
which continues to pour into the cylinder
(each has its own feeder), the air which it
contains is compressed by the volume of
water from above, until it has as much ex-
pansive power when released as steam. The
capacity of the reservoir and of the cylin-
ders is so arranged that the reservoir will
be exhausted by the time the desired com-
pression has been obtained below. While
the reservoir is again filling with water that
in the cylinder is escaping, so that when the
bend in the syphon is reached the contents of
the cylinder is exhausted, and it is ready for
another charge. Thus the operation is re-
peated at regular intervals in each cylinder,
and there being several of them, a contin-
uous charge of highly compressed air is
secured.There seems to be no doubt but that the
air thus compressed can be conveyed by
pipes a reasonable distance and made to do
valuable service at nominal expense. In
France it is conveyed 50 miles. The loss by
friction in transmitting it from the falls to
Buffalo is placed at 50 horse-power on every
thousand, which is scarcely worthy of men-
tion. The projectors of this great enter-
prise are confident that they will be able to
do the pumping for the city water works at
figures which will make the present cost of
the department appear enormous. They are
also confident that they can make compressed
air take the place of steam in manufacturing,
thus doing away with the necessity for fire
or fuel. They are aiming to do wonders,
and what is more, the chances seem to be
strongly in favor of their success.When the Nicholas Railway was built, in
1848, from St. Petersburg to Moscow, the
work was done under contracts with Amer-
ican engineers, and the cars and engines
were supplied from Baltimore by Winans
Brothers. The Russian priests opposed
every modern innovation, and of course
they opposed the railway. When the
road was opened they determined to stop
it, and so they went in force to a point on
the road and set up a holy picture to stop
the work of the devil. The train came
slowly along, and the engineer, seeing the
picture standing on the track, thought there
must be a man behind it, and so came to a
halt. The assembled multitude raised a
shout and the priests called out that the
saint was all-powerful and would prevail
against wickedness. The officer in charge
of the train came out and took a survey of
the situation. Then he told the engineer to
run back a quarter of a mile and bring the
train to a halt. The shouting was redoubled
and the priests were in the most rapturous
delight. But their exultation was soon
changed to grief as the master of ceremonies
told the engineer: "Put on all steam and go-
ahead without regard to consequences." The
engine went ahead and down fell the
holy picture, torn and crushed by the wheels
of an American locomotive. Modern civil-
ization was triumphant, and the priests
and their followers no longer shouted in
triumph.

THE BEST KITCHEN AND TOILET WARE.

It is made of
Decarbonized Iron
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a Perfect Enamel
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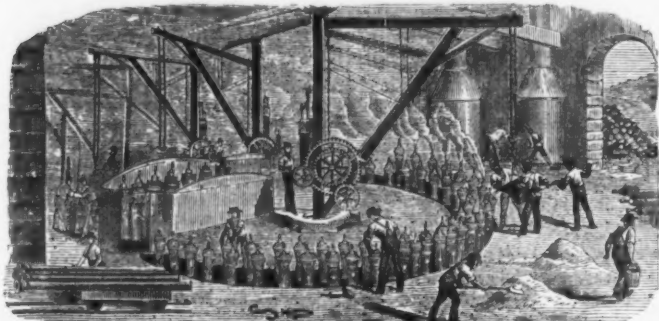
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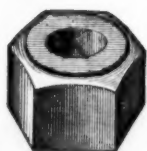
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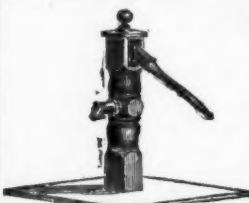
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Pump Material in the rough or in the white. The very best quality of work at lowest prices.

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A superior article delivered at low figures at any furnace within the district or at any point on the Ohio River. Refer to Roane Iron Co., Chattanooga Iron Co., or S. B. Lowe, Chattanooga.

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Late Division Engineer Cincinnati Southern Railway. Will prepare plans and superintend construction of Bridges, Buildings, Roofs, Roads, Streets, Water Works, Sewers, Canals and other public works. Examinations, location and construction of railway lines a specialty. Surveys, examination and reports made of mineral lands. Business attended to thoroughly and promptly.

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Dealer in Charcoal and Coke Pig Iron for Foundry, Forge or Car Wheel purposes.

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This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marches.

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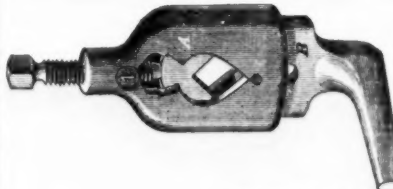
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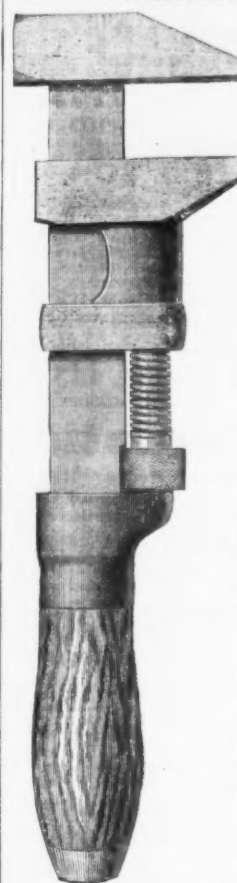
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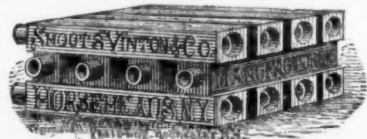
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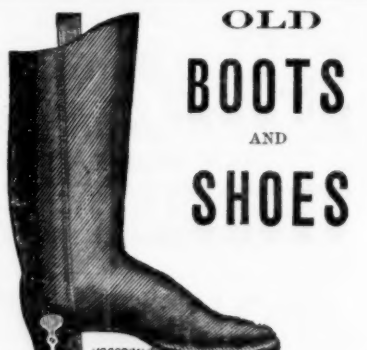
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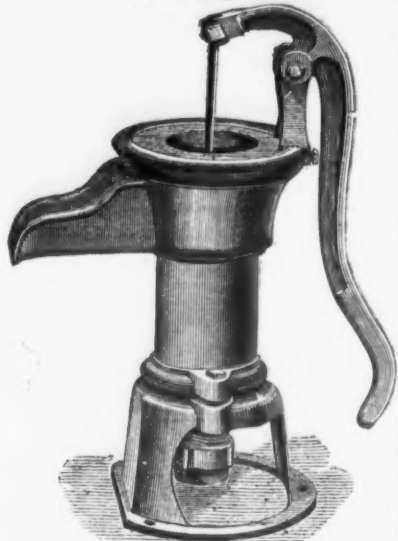
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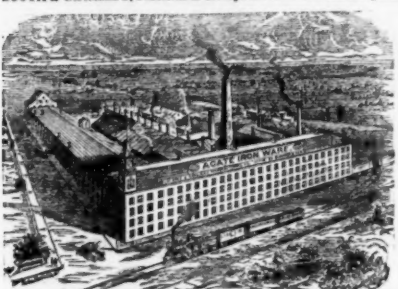


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This Hinge has two flat coil
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Behavior of Steel During Hardening.

Mr. Joshua Rose, M. E., well known to
our readers as a writer upon engineering and
mechanical topics, contributes the following
article to the *Polytechnic Review* upon the
cooling of steel and its behavior during the
process of hardening:

One of the most serious losses common to
our tool and implement manufactories is that
of the cracking and splitting of steel during
the hardening process. Not only is the
article or piece lost after having incurred the
cost of its manufacture, but in many cases
the completion of the machine of which it
forms a part is arrested until the lost piece
is replaced. In many cases this is done at
increased expense, because the piece has to
be made singly instead of with a number of
others, involving as much setting of ma-
chine and adjustment of tools as would be
required for a large number of pieces. Suc-
cessful hardening and tempering is indeed,
even under ordinary and unvarying condi-
tions, considered and kept as a trade secret.
Visitors are excluded from the hardening
and tempering room. In some cases the
method of heating, in other cases the ma-
terial used for heating, in yet others the
cooling mixtures form the supposed secret.
As a matter of fact, however, some of the
very best tool manufactories employ the
simple open fire or furnace and water, and
it is probable that with these two simple
agents good cast steel can be as successfully
and properly hardened for any purpose as it
can be under any other process, and the ad-
vantage gained by heating in fluxes consists
in increased expedition and the necessity for
a less expert manipulation.

The splitting or cracking of steel occurs
during the cooling part of the hardening pro-
cess, and is to be easily avoided even with
the most unfavorable of steels if the condi-
tions of cooling are made to conform to the
form and size of the article. The cooling is,
in a large majority of cases, performed by
dipping the heated steel in water; and the
manner in which the dipping is performed
may be made at will to crack, warp, or
straighten the article.

The instant the surface of a piece of red-
hot steel enters the water a rapid contrac-
tion of the submerged portion takes place,
and unless this contraction is kept equalized to
suit the shape of the article the side or
part most contracted will bend hollow,
causing the diametrically opposite metal to
bend to accommodate the inner curve. Sup-
pose, for example, we heat a piece of steel,
1 inch square and 12 inches long, to a red
heat and dip it slowly in water so that one
side of the square will strike the surface flat
and evenly; then that surface will contract
while the diametrically opposite or upper
surface will remain expanded; the lower
face will curve to a concave, the upper one
to a convex. If, then, such a bar were
curved during the heating process, we may
help to straighten it by dipping it slowly in
the water with its convex side downward.
If it was bent at one end only, we may dip
it at that end first diagonally and with the
convex side downward. If, however, we
dip it with its length lying either diagonally
or horizontally, we are apt to warp it, no
matter how quickly it may be dipped, and
the reason is, in addition to the above, as
follows: Experiments have demonstrated
that the greater part of the hardness of
steel depends upon the quickness with which
its temperature is reduced from about 500°
to a few degrees below 500°, and metal
heated to 500° must be surrounded by a tem-
perature which renders the existence of
water under atmospheric pressure impos-
sible; hence, so long as this temperature
exists, the steel cannot be in contact with
the water, or, in other words, the heat from
the steel vaporizes the immediately surround-
ing water.

The vapor thus formed penetrates the sur-
rounding water and is condensed, and from
this action there is, surrounding the steel, a
film of vapor separating the water from the
steel, which continues so long as the heat
from the steel is sufficiently great to main-
tain that film against the pressure of the
water and the power of the water which
rushes toward the steel to fill the spaces left
vacant by the condensation of the vapor as
it meets a cooler temperature and condenses.
The thickness of the vapor film depends
mainly upon the temperature of the steel.
But here another consideration claims atten-
tion. As the heated steel enters the water,
the underneath side is constantly meeting
water at its normal temperature, while the
upper side is surrounded by water that the
steel has passed by and, to a certain extent,
raised the temperature of. Hence the vapor
on the underneath side is the thinnest, be-
cause it is attacked with colder water and
with greater force because of the motion of
the steel in dipping. Suppose, now, we
were to plunge a piece of heated steel into
water and then slowly move it laterally, the
side meeting the water would become the
hardest and would be apt to become concave
in its length.

From these considerations we may per-
ceive how important a matter the dipping is,
especially when it is remembered that the
expansion which accompanies the heating is
a slow process compared to the contraction
which accompanies the cooling (although
their amounts are of course precisely equal),
and that while unequal expansion can only
warp the article, unequal contraction will,
in a great many or, indeed, in most cases,
cause it to crack or split.

After an article is dipped to the required
depth, it should, if straightness is of impor-
tance, be held quite still until reduced to the
temperature of the water, because, if taken
out before so reduced in temperature, it is
especially apt to crack; and it is better to
have a deep tank of water, if the body of
the metal is great, so that the steel may be
dipped slowly downward and become cooled
sufficiently rapidly to harden without any
lateral movement, except it be after the
steel has lost its redness.

When a piece of steel requires to be har-
dened at one end only, the dipping must be
performed with a view to make the gradua-
tion from the soft to the hard metal extend
over a broad section of metal; for if the
junction of the hardened with the soft metal
is abrupt, the hardened end is apt to break
short off. The method of dipping, there-
fore, is, in this case, to plunge the end of
the steel vertically into the water, to a depth

a little more than equal to the depth it re-
quires hardening, and, after holding it still
there until it is black hot (that is, as soon as its
redness is gone), dip it slowly a little deeper,
and then raise it up to the amount of the in-
creased dipping, and slowly immerse again.

When a piece of metal requires hardening
and tempering at one part only, we may
heat the steel back of the part to be tem-
pered to redness, and dip the article so as to
harden the required part, and leave sufficient
heat in the contiguous metal to raise the
temperature of the hardened part enough to
temper it. This plan is always followed in
the tempering of lathe and planer tools, flat
drills, &c. If, however, the method of dip-
ping is to hold the steel in the water at an
even depth after the immersion, the temper-
color will be very narrow, while, if the steel
is raised and lowered in the water, the color-
band will be broad.

Recent Armor Plate Tests.—The Shef-
field Independent gives an account of the
most recent armor plate tests, which were
more successful than any of the preceding.
In continuation of the Admiralty experi-
ments with armor plates, a composite plate
manufactured by Messrs. Cammell & Co.,
of the Cyclops Works, Sheffield, was sub-
jected to gunnery tests on May 30, on board
the target ship *Nettie*, in Portsmouth
harbor. The plate tested was 8 feet long
by 6 feet 3 1/2 inches in width, and 9 inches
thick, its weight being slightly over 8
tons. It was composed of 3 1/2 inches of steel
and 5 1/2 of iron. The gun used was a 12
ton 9 inch muzzle loading rifle, and the
charges were 60 lbs. of battering gelatin pow-
der; the projectiles were chilled Palliser shots
25 lbs. in weight, the muzzle velocity being
1420 feet per second, and the energy at the
muzzle 3486 feet. Three rounds are usually
fired at a plate, and hitherto that number
has done irretrievable damage, but the
plate fired at was so comparatively invul-
nerable as to lead to two extra shots being
fired to ascertain whether it was possible to
break it up. The impact of the first three
shots formed a triangular diagram, being
about 2 feet apart. The first projectile
struck the plate on the right-hand side, and
penetrated nearly 7 inches, occasioning a
series of superficial cracks. The impact of
the next shot was the lower section of the
plate, the penetration being a trifle more
than 7 inches, and the further injury a fis-
sure, graduating to the bottom of the plate,
going right home to the backing. The
third shot made a number of cracks, rather
insignificant in their character, and pen-
etrated 6 1/2 inches. This depth of penetra-
tion needs to be explained, for to those un-
acquainted with the previous experiments
the idea may be conveyed that this test was
rather a failure. At 10 yards distance,
with so powerful a gun as a 12-ton 9-inch
rifle, a shot penetrates clean through an iron
plate and partly through the backing, and
in a lesser degree the same result has at-
tended the experiments with composite
plates, excepting in the case of that man-
ufactured by Sir J. Whitworth, which was
an extraordinarily expensive one, being
studded with intensely hardened steel plugs.
The fourth shot was aimed at the center of
the triangular diagram, and practically
broke the plate in two; the width of the fis-
sure being three-eighths of an inch. Neither
part, however, came away from the back-
ing. The fifth projectile struck the right-
hand low corner of the target, and carried
away the section bodily. All five shots
were smashed to fragments by the concus-
sion, only their heads being embedded in
the plate.

The Use of Emery Wheels.—In an En-
glish lecture on emery wheels the following
paragraph is found: "A common delusion
prevails that an emery wheel is a tool re-
quiring neither skill nor practice, and it is
left to any one who chooses to work it. The
result of this same system, as applied to grind-
stones, has caused that article to assume the
simply disgraceful appearance it often
exhibits—untrue, worn into grooves and
hollows, no one responsible for keeping it
right, and the result utterly wrong. This
system pursued with emery wheels is simply
fatal to their chance of success. Mount an
emery wheel on a suitable machine on a
rigid foundation (do not put a heavy wheel
on a light spindle); run it at a proper speed,
checking the calculation with a speed
counter; keep it absolutely true with the
diamond (a tool not half used), press the
work lightly on to the wheel—'crowding
the work,' as it is called, heating more and
doing less than gentle pressure; appoint a
careful man to use it, and make him respon-
sible for its condition, allow him a reasonable
time to learn and understand a new tool and
one possessing very great and unusual power,
and the result cannot fail to be satisfaction
of the very highest degree. But set an
ignorant or prejudiced mechanic to a badly-
appointed machine with untrue wheels, and
expect him to turn out as good work in an
hour as he does by other means after years
of training, and the result, of course, will be
disappointment and condemnation of the un-
fortunate emery wheel."

There is building in Cleveland a car to run
upon a one-rail track now in operation near
the oil regions of Western Pennsylvania.
The road is a single-rail track six miles
long, and is said to be doing a large freight
and passenger business. The car is not un-
like an ordinary passenger car in looks. It
is 28 feet long, 5 feet 2 inches wide, with
seats running lengthwise of the car as in
English railway carriages. Underneath the
car, and running its entire length, are two
sections or boxes, flush with the outer sides
of the car, 3 feet 8 inches deep, with suf-
ficient space between each section for the
wheels and the rail they travel on. The
sections serve to balance the car upon the
rail, and also for the carriage of baggage.
In the floor at each end of the car is a 3-
inch double flange wheel, with the axles set
in the floor with right angles to its length.
The upper half of the wheel is, of course,
covered. The rail is laid upon piles about
4 feet high. Along the piles, on each side,
about a foot below the rail, are laid flat rails.
The inner sides of the two sections that
come below the rail have friction rollers that
run snugly on the flat rails, thus further
tending to balance the car and steady it
while running. The car will cost about \$4000.



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Protective Ventilators avoid drafts, exclude dust, dampness, malaria and germs of disease; adopted by hospitals, schools, institutions, &c.; applied to any window or room.

Prof. A. L. Loomis, M. D., University of City of New York, writes as follows:
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No. 6.



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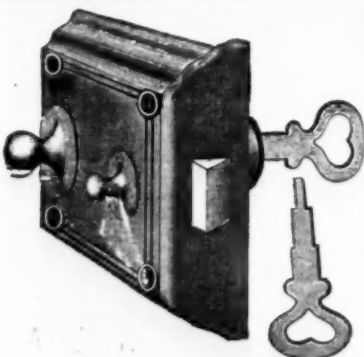
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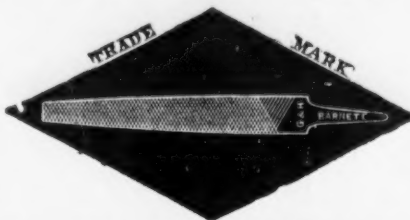
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Cylinders adjustable for doors from 1 1/4 inch to 2 inches.

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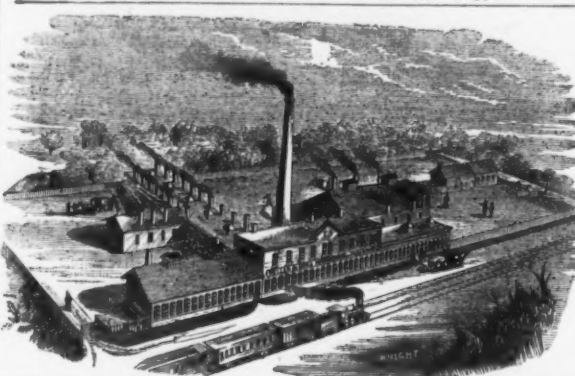
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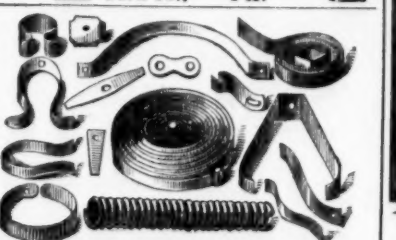
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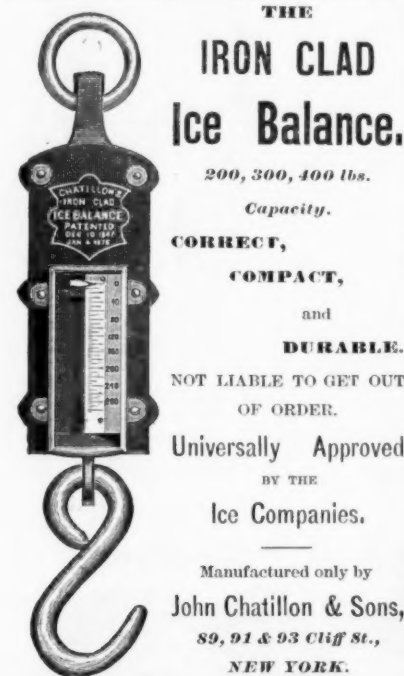
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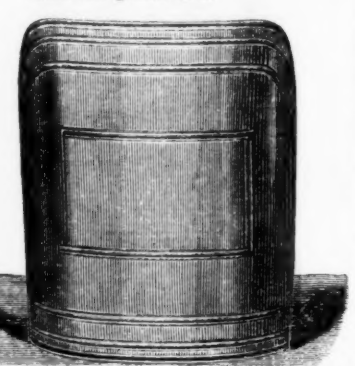
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MEDALS AWARDED: Paris Exposition, 1867; Vienna Exposition, 1873; Philadelphia, 1876.

Illustrated Catalogue sent per mail on application.

Proof Strains for Chain Cables.

A Letter from Commander Beardslee,
U. S. N.

To the Editor of The Iron Age: Throughout the United States, and probably throughout Europe, the custom obtains among manufacturers of chain cable to prove their cables before placing them upon the market, and in the United States it is quite common to read in the circulars of such manufacturers that their best cables are guaranteed as having withstood without injury the proof strains prescribed by the standard table of the British Admiralty.

Adopted thus as a suitable standard by which the value of American cables are measured, it is certainly of great importance that its requirements should be such as can be met by cables made of American chain iron and they undergo no risk of becoming seriously injured and weakened by its action.

The object of this paper is to show:

1. That the table is the standard by which many of our best cables are judged.

2. That, for reasons which will be assigned, the operation of the strains which are prescribed by this table do inflict serious injury upon cables made of American iron, in some cases to the extreme extent of destroying their value.

The writer of this paper has received during correspondence with manufacturers of and dealers in cables a large number of letters and circulars, in many of which the claim is made that "all cables are tested by the Admiralty standard."

From two manufacturers copies of the tables used by them were received; these differ but slightly from each other, and nearly coincide with the "Admiralty Test Table for Studded Chains," as given in the American Lloyd's for 1875, and in previous editions, so nearly that it is evident they are derived from the same source. This source is unknown to the writer; but there is in common use in most chain shops a "rule of thumb" by which the Admiralty proof strain for any size can be calculated, which is this: Square the number of circular eighths of an inch in the diameter of the bar, multiply by 630 and the result is the proof strain.

Examples: 1-inch bar = 8 circular eighths, $8^2 = 64 \times 630 = 40,320$, proof for 1 inch; 2-inch bar, 16 circular eighths, $16^2 = 256 \times 630 = 161,280$, proof for 2 inch.

In the following table the strains given in column 2 are quoted from Lloyd's, those in column 1 are calculated by the above rule, and those in columns 3 and 4 are such as were furnished by the manufacturers:

ADMIRALTY STANDARD, AS OBTAINED FROM VARIOUS SOURCES.

Size of wire.	Calculated.	Lloyds.	Mfr. A.	Mfr. B.
Inches.	Pounds.	Tons.	Tons.	Tons.
1	40,320	18	17½	18
1 1-16	45,312	20.3	20	20
1½	51,030	22.78	22½	23
1 3-16	56,857	25.38	25	25
1¾	62,684	28.12	28	28
1 5-16	68,457	31.04	31	31
1 7-16	74,230	34.03	34	34
1 9-16	80,003	37.02	37	37
1 11-16	85,776	40.50	40	41
1 13-16	91,549	43.94	44	44
1 15-16	97,322	47.53	47	48
1 17-16	103,095	51.25	51	51
1 19-16	108,868	55.12	55	56
1 21-16	114,641	59.05	59	59
1 23-16	120,414	63.33	63	64
1 25-16	126,187	67.57	67	68
1 27-16	131,960	72	72	72
1 29-16	137,733	76.59	76	76
1 31-16	143,506	81.25	81	81.3
1 33-16	149,279	86.13	86	86
1 35-16	155,052	91.10	91	91.1

It is probable that the occasional discrepancies found in the foregoing are due to differences in judgment when turning pounds into tons and fractions of tons and back again into pounds. There is nowhere a variation which would cause one table to be any less reliable and valuable than the other; but it is claimed that all based upon the same rule are constructed on erroneous principles, and that their use involves probable injury to the cables proved by them.

The limit of stress which should be applied as proof to a finished product should not be so great that it exceeds the elastic limit and produces excessive and permanent distortion. All of the strains given in the table do thus greatly exceed this limit.

Again, there can be no reason assigned which will justify the subjection of the different sizes to strains which greatly differ in their proportions to the actual strength of the links. The strains prescribed by this table are distributed thus unequally. The rule assumes that the strength of round iron bars varies directly with variation in the area of the bars. That this is not the case has been conclusively established by the results obtained by the United States Testing Board, in testing many bars of a great variety of iron.

There is a variation in proportional strength found to accompany every change in diameter, except in such cases where through irregularities in heating the piles the natural effect of variation in production is counteracted. Such irregularities are liable to take place in spite of the utmost care, therefore the rate of variation in strength due to reduction alone is one which cannot be established so exactly that it can be considered as fixed; but it can be asserted safely that if no disturbing cause acts upon the bars every diminution in diameter will be accompanied by an increase of proportional strength, and that although irregular heating may cause an interruption to the rate of increase between sizes approximate to each other, yet that all counterbalancing causes will not be sufficient to reduce to an equality the proportionate strength of the bars of the extreme sizes of which cables are generally made, viz., the 2-inch and 1-inch round. Therefore as it will, and from the very nature of the processes of manufacture must, exist, this variation should be allowed for in all tables purporting to give the strength of productions from round iron bars of various sizes. Whether there are any tables extant in which this element is taken into consideration or not, it is very certain that in numerous important tables it is not, among which may be mentioned, in addition to the table under discussion, that of the British War Department, as given by John Anderson, L.L.D., for the testing of unstudded chains, and that of the United States government for the test of studded ones. The result of the neglect of this variation, as affecting the Admiralty test table, is that the cable made of 2-inch wire is, while being

proved, strained in proportion to its probable strength over six per cent. of that strength to a greater extent than the 1-inch cable.

This may be shown in this manner: Assume that two cables of the sizes mentioned are to be proved, both made from bars of the same iron with equal care, the only known cause for difference in strength being that due to the difference in size. If made of a fair quality of American chain iron, it is more than probable that the tenacity per square inch of the smaller bar will exceed that of the other by at least 5000 pounds. If, then, the 1-inch bar is equal to 55,000 pounds, the 2-inch will be equal to but 50,000 pounds per square inch; the ultimate strength of the two bars will be 43,200 pounds and 157,000 pounds. If when made up into cables the links of both preserve a uniform percentage of the original strength of the bars, the original difference in proportional strength will also have been preserved. If both develop in the form of cable, say, 165 per cent of the bars' strength (which is as high a percentage as can be expected), then the strength of the cables will be 71,275 pounds and 259,000 pounds respectively, of which strength the proof strain of the 1 inch (40,320 pounds) is 56.5 per cent, and that of the 2 inch (161,280 pounds) is 62.2 per cent.

There is no reason why the large cable should be expected to resist uninjured a stress so much greater in proportion to its strength than the small one; there are many reasons why it should, on the contrary, prove less able, among which may be assigned the fact that throughout every step of the various processes by which the piles of crude iron are transformed into finished cables, the larger piles, bars and links are more exposed to irregularities in treatment (which tend to produce corresponding irregularities in strength) than are the small ones. And it is more than probable that when in service a much greater amount of life and property will depend upon the strength of the large than upon that of the small chain. Were the percentage of the probable strength of the 2-inch cable reduced to an equality with that to which the 1 inch is subjected, the strain would be six tons less than that prescribed. And as the 56 per cent. would probably far exceed the elastic limit of the best and strongest of the many links of which the cable is composed, an addition to this strain would necessarily produce injurious effects far in excess of those which the same amount would cause if less preceded it. After the elastic limit has been reached and passed the effect of even a slight addition is very disproportionate to the amount. A single instance where the effect of undue strain has been observed will demonstrate this point. While testing the Admiralty strains, a section of 2 inch cable 15 fathoms in length, made of most excellent iron, was measured at intervals; the first perceptible elongation took place at about 108,000 lbs., or about 48 tons; at 56 tons the cable had stretched 25 inches; an addition of 4 tons increased the stretch to 35 inches, and 8 tons more carried it to 50 inches; thus 12 tons added to the 56 tons more than doubled the stretch. At 68 tons it was considered to be unadvisable to further injure the cable in endeavoring to test the table of Admiralty strains.

It seems probable that the high strains of the Admiralty table are based upon an assumed strength which does not exist in links made of American iron. Anderson states that cable bolts are "required to possess tenacity equal to 60,000 lbs. per square inch." Our market does not furnish a great deal of such iron, and that which is equal to the above standard cannot be made or sold at a price which would bring it within the limits of "chain iron."

During the testing by the United States Board, six sections, each five fathoms in length, of 1½ inch and 1½ inch cable, were given the extreme test required by the table. After test the average elongation of the 1½ inch was 14 inches, of the 1½ inch, 18 inches; the chains passed the ordinary inspection in the shop and no links were pronounced injured; but upon removing them to the sunlight and carefully inspecting again by the aid of a magnifying glass, 14 out of the 387 links were found to be cracked. Had these cables been issued for service, it is more than probable that some heavy, sudden strain would have brought the defects plainly into notice. Even though the links should escape cracks, the disturbance to the atoms of the iron produced by the distortion would tend to render it more brittle and thus lower the power to resist sudden strains, although that of resisting steady strains might be increased.

The proof table used by the War Department in England, as given by Anderson in his work on the "Strength of Material," published in 1872, is open to the same criticisms as have been made upon that of the Admiralty, it being based upon an assumed strength varying directly with the area; but owing to the fact that it is intended for the test of unstudded chains (which both he and Rankin hold to possess less strength than studded ones), the strains prescribed will not overprove the cables. They are as follows: For 1 inch, 12 tons; for 1½ inch, 15¼ tons; for 1¾ inch, 18¾ tons; for 1½ inch, 22¾ tons; for 1½ inch, 27 tons.

In this scale the multiplier constant 420 is substituted for the 630 used in producing the Admiralty table, which agrees with Anderson's (or Rankin's) expressed views, "that the unstudded cable is two-thirds as strong as the studded one of the same diameter of wire."

THE UNITED STATES GOVERNMENT PROOF TABLE.

The chain manufacturers of this country would run much less risk of injury to their products were they to adopt the proof strains by which government cables are proved. The strains prescribed for cables of all sizes are not greater than they can bear with safety. But even this table, free as it is from dangerous faults, can be fairly criticised. It is constructed on erroneous principles, and the strains prescribed are not uniform in their proportions to the strength of the various sizes.

To make these points clear the table will first be given, and in the third column the irregularity is shown, by the variations in the differences of the additions to the

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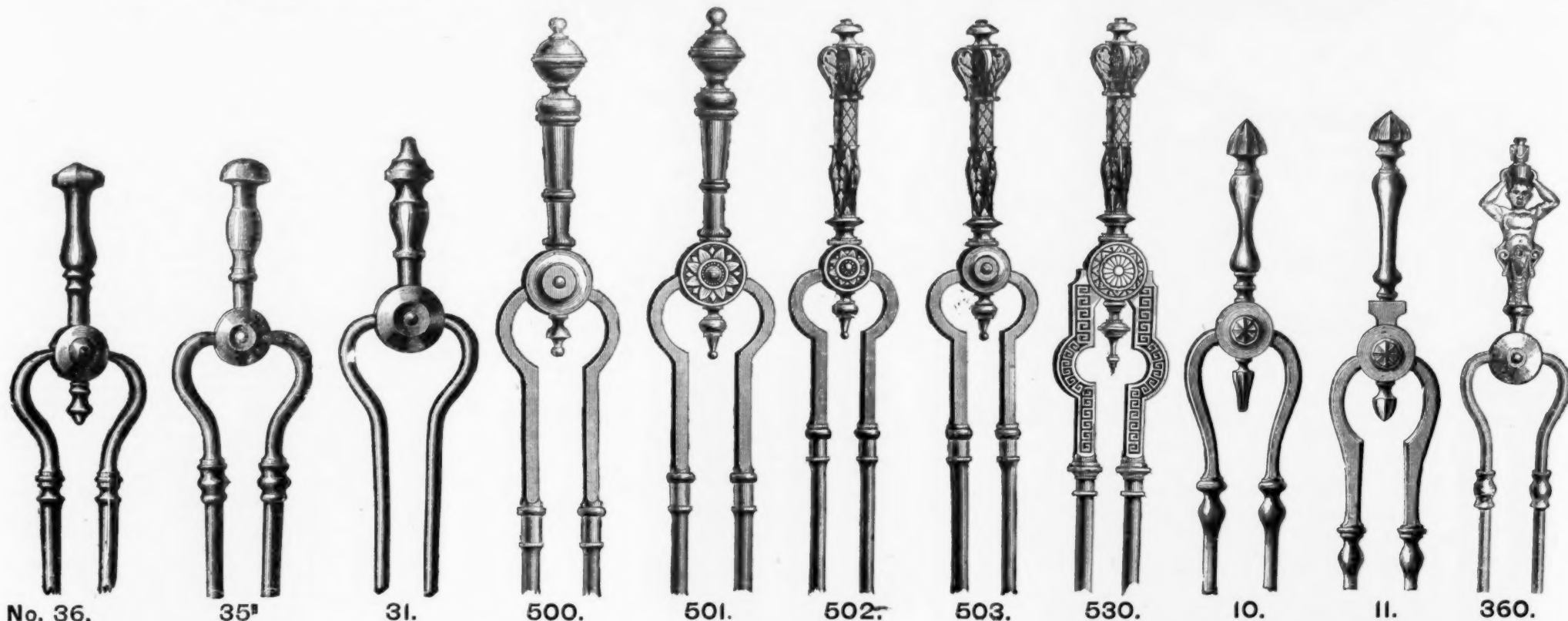
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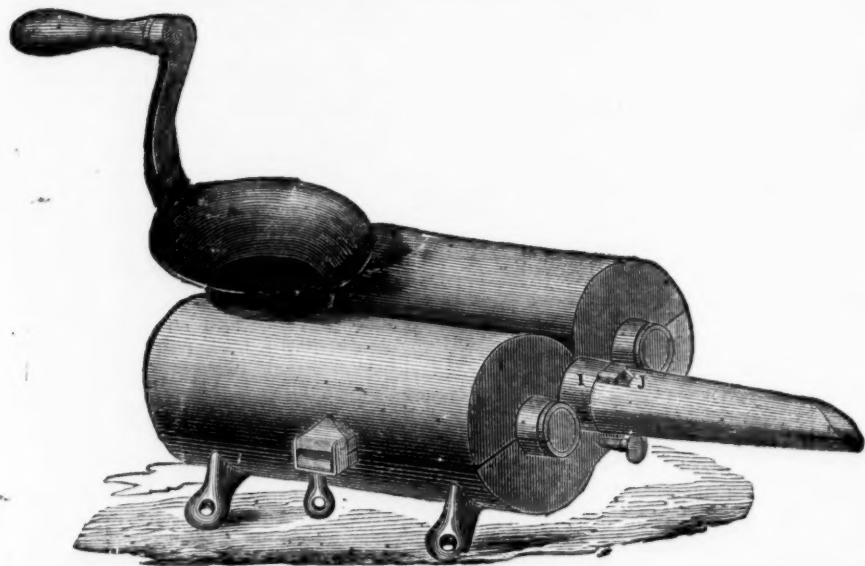
WM. H. COLE, AGENT,

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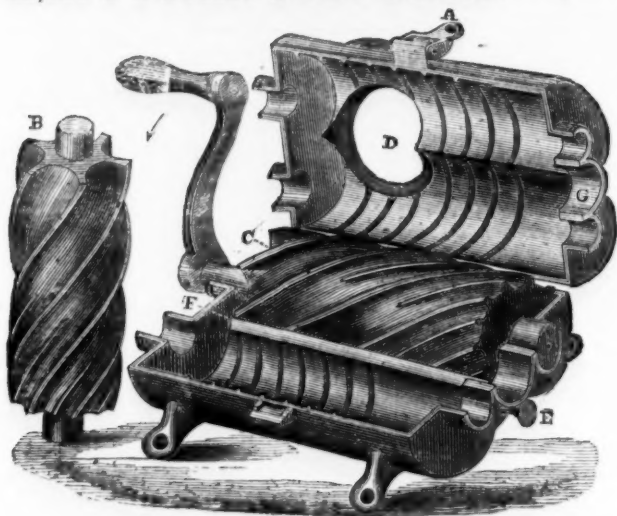
POLISHED FIRE IRONS.



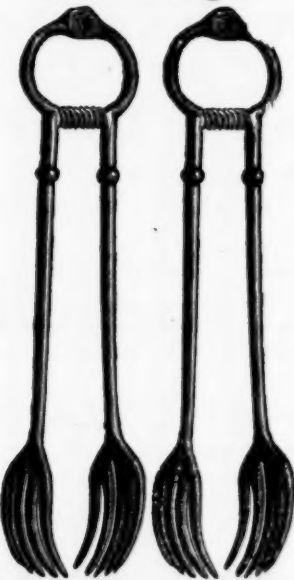
Hale's Patent Meat Cutter.



Hale's Patent Meat Cutter.—Open.



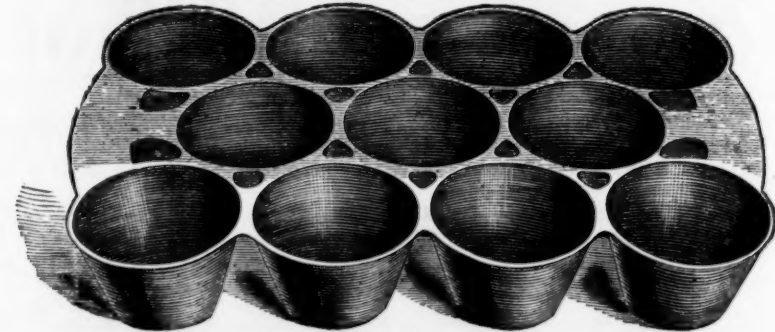
Coal Tongs.



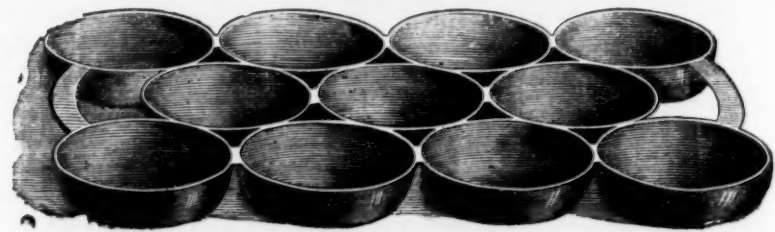
Butcher's Meat Cutter



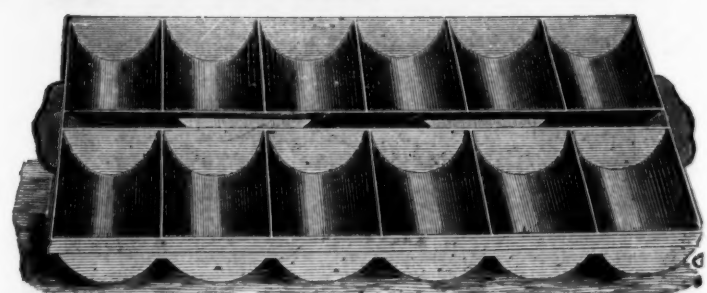
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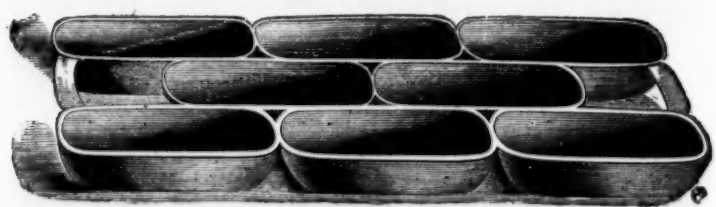
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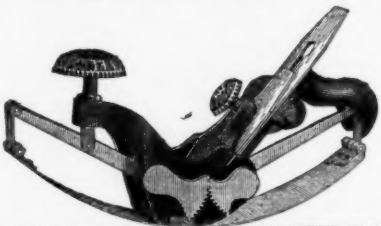
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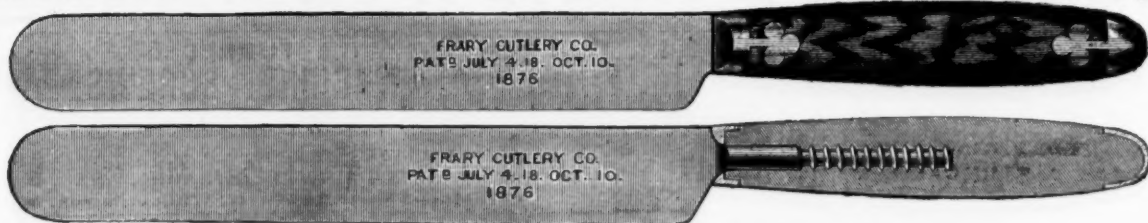
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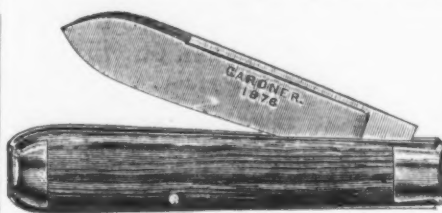
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MANUFACTURERS OF SUPERIOR

Table & Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST
MATERIAL.

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GENERAL HARDWARE MERCHANTS,

And of

Ball's Pat. Solid Steel Sheep Shears.



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House Furnishing Goods.

Agent for the

Champion & Knox No. 99 Fluting Machines,

EUREKA & PEERLESS WRINGERS.

100 Chambers St., New York.

strains prescribed for the proof of any one size, which gives the proof strain of the cable one-sixteenth inch greater in diameter:

Size.	Proof.	Diff. for
Inch.	Lbs.	1-16 inch.
1	20,800	1,800
1 1/16	30,600	3,800
1 1/8	34,600	4,000
1 1/4	40,800	4,200
1 1/2	44,800	4,400
1 5/8	50,400	5,000
1 3/4	56,000	5,600
1 7/8	61,200	5,200
1 15/16	66,600	5,400
1 16	72,000	5,400
1 1/2	78,000	6,000
1 11/16	83,200	5,200
1 3/4	87,800	4,600
1 13/16	91,800	4,000
1 7/8	100,800	9,000
1 15/16	108,600	7,800
2	117,600	9,000

The irregularities in the differences cannot be explained by any theory based upon the strength of wrought iron. The strains are not too high, and this fact is probably due to the order of the Board of Navy Commissioners, Commodore Morris, Smith and others, who in 1820, in establishing a scale, gave orders that if, upon trial, any section of 15 fathoms was found to have stretched over 6 inches, the fact was to be reported.

As the principles upon which this table was constructed are unknown, it will be necessary, in endeavoring to prove that they are erroneous, to reason somewhat by analogy, and make use of the principles upon which the Admiralty table is based, in an attempt to find them; first by application of the rule by which the proof for each size is found by multiplying the square of the circular eighths by a number which with the Admiralty table is constant; then reversing the process, and dividing the proof strains of this table by the square of the eighths, we procure the following series of numbers, beginning at the 1-inch size, viz.: 410, 423, 427, 452, 448, 457, 462 1/2, 463, 462 1/2, 460 3/4, 461 1/2, 450 1/2, 447 3/4, 436 1/2, 448, 452, 450 1/2.

Throwing out the occasional irregularities not to be accounted for, we see that in this table there is an allowance made for variation in strength accompanying variation in diameter which is not made in the Admiralty table. Between the multipliers for the 1 and 2 inch size there is an increase of 40 1/2 pounds by somewhat irregular steps. But this allowance is made in the wrong direction; instead of increasing with increase of diameter it should decrease.

This can be best shown by a few figures, based upon the Admiralty table, in which the multiplier is constant. Selecting the 1 and 2 inch sizes we have, multiplying by 630 each square of the number of circular eighths and dividing results by areas:

$$64 \times 630 = 40,320, \frac{40,320}{.7854} = 51,331 \text{ lbs.}$$

$$\text{and } 256 \times 630 = 161,280, \frac{161,280}{.3142} = 51,331,$$

the final results being the strength per square inch in pounds.

If instead of employing the constant multiplier 630 to obtain, as above, the strength for all sizes, we should, having used it for the 1-inch size, increase it with each increase of diameter (as is done irregularly in the U. S. table) we should by so doing call for an increase of strength per square inch to accompany increase in diameter.

If for the 2 inch we use 640 instead of 630, the result would be that we called upon the 2-inch bar to be equal to 52,145 pounds per square inch, the 1 inch being nearly a thousand pounds less. In the U. S. table the multiplier for 1 inch is increased 40 pounds to produce the strain for 2 inch.

As rolled wrought iron does not increase in its proportional strength in proportion to increase of area, it is evidently wrong to use, in forming a table which should be based upon its strength, data calculated upon the theory that it does so increase.

Were not the strains of the government table all within the limits of the margin of safety, it would be better that no allowance for the variation should be made than to thus allow it the wrong way.

PROOF AND BREAKING STRAINS OF CHAIN

CABLES,

as given in the "Engineers and Mechanics' Pocket Book." By Chas. Haswell. Edition 1875.

This table has simply an erroneous title, which should be instead:

"Strength of round bars of various sizes, based on an average tenacity of 55,000 lbs. per square inch, and column showing the half of each strength."

Its insertion under its present title is probably due to inadvertence, and it needs no further consideration.

It having thus been shown that all of the tables which are used in this country are incorrect, if such showing is accepted our chain manufacturers would find themselves without a standard. Recognizing this fact, the United States Board appointed to test iron, steel, &c., has thought it advisable to prepare from the data collected a new proof table, in the construction of which full consideration has been given to the strength and elastic limit, and to the variation in strength, due to variations in the reduction by the rolls.

And it is considered that by the adoption of this table cables can be proved to such extent that the presence of defective links may be discovered, and not to such an extent that the very proof shall produce defects which may not be discovered in time.

L. A. BEARDSLEE, Com. U. S. N.

A correspondent writes thus to the St. Louis Journal of Commerce from North Carolina: On my way here I took in the celebrated Ore Knob. I had often heard of this noted copper mine, but was somewhat surprised at the magnitude of the work done here and to see a nice village. There are in operation six blast furnaces and one refiner. This department works 100 hands, and consumes 300 bushels of coal per day. In a short time there will be four more furnaces in operation. This little village gives employment to a great many workmen. There are about 700 here in all—400 on the hill and 300 in the forest preparing wood and coal. During the month of April there were made and shipped from this place 54 tons of copper.

12 14 16 18 20 22 24 OZ.

TACKS.

10 8 6 4 3 2 1 1/2 1 OZ.

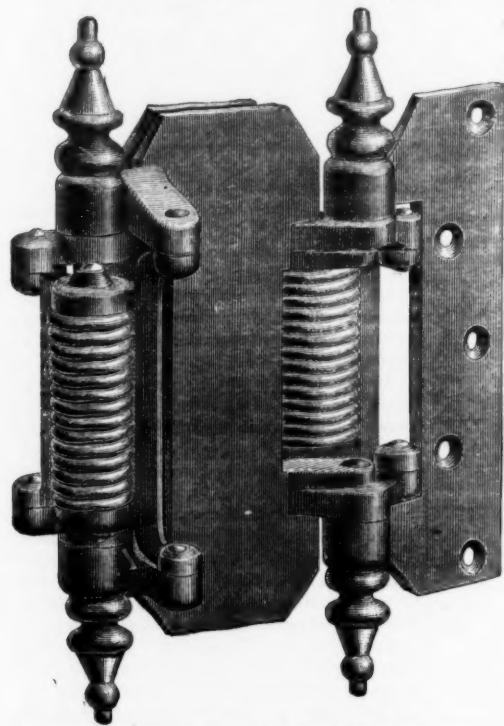
Swedes Iron, Upholsterers', Gimp & Cut Tacks.
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Regular and Chisel Pointed Boat Nails of Copper, Iron or Galvanized, Copper, Brass and Iron Wire Nails (Blued, Bright or Tinned), Escutcheon Pins, Chair and Cigar Box Nails, 2d & 3d Pine Nails, Roofing Tacks and Nails, &c., &c.

Made by the **AMERICAN TACK CO.**, Fairhaven, Mass.
A full line of goods may be found at the
NEW YORK SALESROOM, No. 117 Chambers Street.

Spring Butts for Screen Doors,

ON A NEW PRINCIPLE, THE MOST DESIRABLE.



POINTS OF SUPERIORITY:
They exert their greatest force at the closing point.
They will not allow the door to sag.
They will retain the door against the wall when opened back of a right angle.

Single acting, for swinging doors one way, doors 7/8 or 1 in. thick, per pair, \$1.25
Double acting, for swinging doors both ways, per pair, 2.00
Liberal discount to the trade.
Send for circulars and prices.

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Unionville, Conn., U. S. A.

We can also furnish all sizes of larger Butts, working on same principle.
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Seat Fasteners.

The Safest and only reliable Seat Fastener for Wagons.

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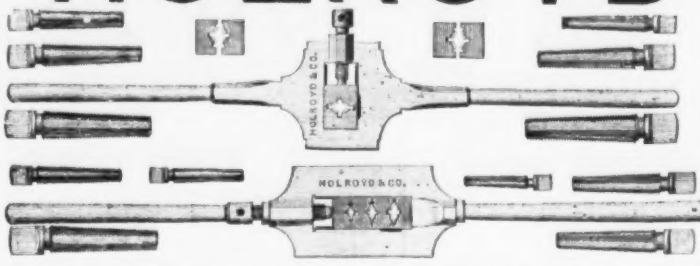
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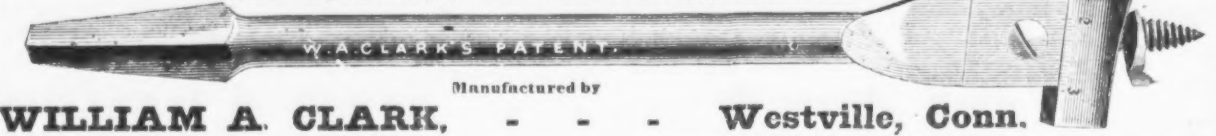
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Waterford, N. Y.

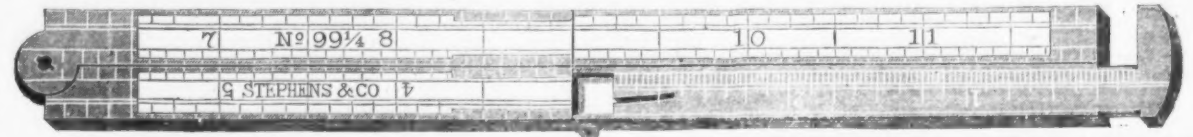


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Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other
Two sizes: Large Size Boring, 7/8 to 3 inches; Small Size Boring, 1/2 to 1 1/4 inches.



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Also Exclusive Manufacturers of L. C. STEPHENS' PATENT COMBINATION RULE.
Rules graduated in foreign measure to order.
STEPHENS & CO., H. DURKEE & CO., New York Agents, who will supply the trade at factory prices.



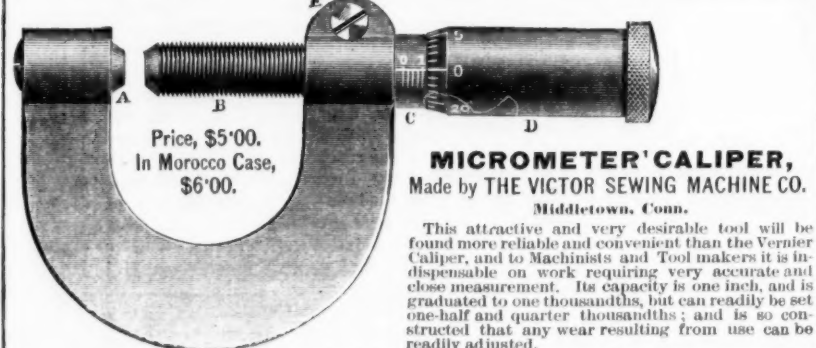
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Manufacturers of DAMAN STANDARD HOLLOW AUGERS.—Universally acknowledged superior to any other in the market. They have recently been improved, making them, as now offered to the trade, the most perfect tools of their kind, either in design, material or workmanship. SPOKE AND DOWEL TURNERS.—The very best as well as the cheapest. METALLIC COMBINATION FLOW PLANE.—Made of solid cast steel and of gun metal. Of an entirely new design. Can be used as Groover, Dado and Rabbit Plane. In any direction of the grain, and also as a Match Plane. COMMON SENSE DOOR CUTTERS.—To cut lead pipe in any position and without chips or burrs. Please send for circulars and prices.

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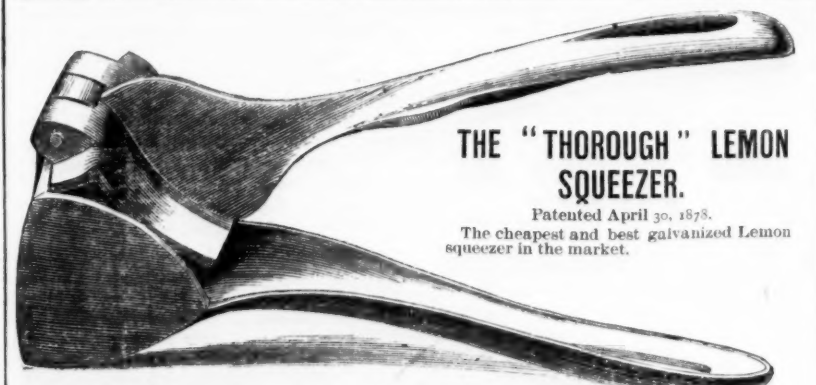
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106 and 108 Beekman St., New York,
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Dog Muzzles, Wire Cloth and Netting, Moulder Riddles, Decoy Rat and Mouse Traps, Wire Dish Covers, Flour and Meal Sieves, &c., &c.,
At the Lowest Prices.



Price, \$5.00.
In Morocco Case, \$6.00.

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This attractive and very desirable tool will be found more reliable and convenient than the Vernier Caliper, and to Machinists and Tool makers it is indispensable on work requiring very accurate and close measurement. Its capacity is one inch, and is graduated to one thousandths, but can readily be set one-half and quarter thousandths; and is so constructed that any wear resulting from use can be readily adjusted.

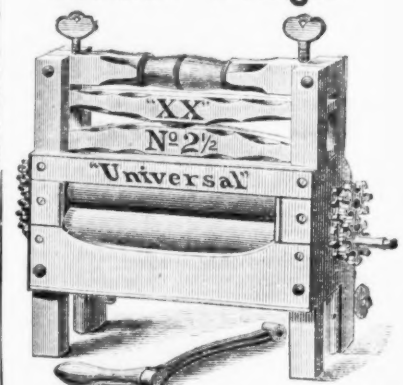


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The cheapest and best galvanized Lemon squeezer in the market.

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Over 500,000 sold!
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Be sure and inquire for the "Universal."
Sold by dealers everywhere.

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Cheapest and best for all purposes—simple, strong, and durable. Also Traction Engines for common roads.
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Vertical Engines, with or without wheels, very convenient, economical and complete in every detail, best and cheapest Vertical in the world. Fig. 1 is engine in use, Fig. 2 ready for road.
The Farquhar Separator (Warranted) Tests Agricultural Works, York, Pa. Lightest draft, most durable, simplest, most economical and perfect in use. Washes clean, ready for market.
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Patent Portable Hoisting Machines
PRICE LIST.

To Lift	To Raise	Price	Ex. Ft.
8 ft.	500 lb.	\$22 50	\$1 00
8	1,000	25 00	1 20
8	2,000	30 00	1 50
8	3,000	40 00	1 75
9	4,000	50 00	2 00
10	5,000	75 00	2 20
10	8,000	95 00	2 40
12	12,000	150 00	3 75
12	15,000	225 00	4 75
12	20,000	300 00	6 00

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Also Manufacturers of Machine Tools.
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NONESUCH Self Locking and Burglar Proof Window Locks.
Cheapest and best in the market. Send 25c. for sample, price list, &c., to
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The Iron Age.

New York, Thursday, June 27, 1878.

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JAMES C. BAYLES . . . Editor.
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One square (12 lines, one inch), one insertion, \$2.50; one month, \$7.50; three months, \$15.00; six months, \$25.00; one year, \$40.00; payable in advance.

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The American Hardware Company, Melbourne, are our agents for Australia. Sample copies will be mailed free of charge, to any firm engaged in the trades we represent in Australia, Tasmania and New Zealand.

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Forty-first Page.—Boston and St. Louis Hardware and Metal Prices.

An important decision has just been rendered by the Supreme Court of Illinois in a case where the United States Mortgage Co. of New York was plaintiff, and which turned on the point whether the Mortgage Company—a foreign corporation, organized under the laws of New York for the purpose of lending money—could lend money in Illinois and enforce its securities against real estate. The court holds that as the

company was not primarily organized for the purpose of acquiring land, but only for the purpose of lending money, the State statute of 1875 validating all such loans and giving to companies thus organized the same right of recovery that individual creditors possess, is retroactive in its operation, and covers all mortgages heretofore made by such companies.

The Influence of a Tariff upon International Trade.

The *Saturday Review* in commenting on a paper on the growth of Great Britain's foreign trade since 1856, lately read before the Statistical Society by Mr. Newmarch, concludes its article with a suggestive paragraph which merits quotation: "What will surprise most persons is the very slight effect which hostile foreign tariffs have exerted upon our exports. Mr. Newmarch has prepared a table in which he classifies the several countries with which we trade according to the degree of hostility of their tariffs, and he exhibits the proportion borne by our exports to those countries to our imports from them. We find that in the period 1856-59 the proportion in the case of the most hostile averaged 64 per cent.; in 1875-77 it had fallen to 51 per cent. This, then, was the greatest effect that can be attributed to the most hostile tariffs—to reduce the proportion of our exports to our imports barely 13 per cent. But it may be questioned whether the effect is due to the hostile tariffs; for in the years 1870-74 there was no reduction in the proportion, but rather a slight increase. The falling off, therefore, is chiefly, if not entirely, due to the extreme depression under which those countries have been suffering since 1873. If so, hostile tariffs merely prevent a growth of our exports. The fact has an important bearing on the policy of commercial treaties, besides disposing of the nonsense that is talked respecting the injury done 'us by protection abroad.' After reading such a statement it naturally becomes interesting to verify it by an examination of statistics. We regret that we have not seen Mr. Newmarch's tables to which reference is made above, but our own foreign trade statistics furnish abundant evidence that much of the familiar talk about the effect of our tariff upon our foreign trade is 'nonsense' of the worst kind. We invite attention to the following tables, compiled with great care from official data, showing the foreign trade of the United States since 1850:

IMPORT AND EXPORT TRADE OF THE UNITED STATES DURING THE FISCAL YEARS 1850 TO 1877 INCLUSIVE, MERCHANDISE ONLY, SPECIE VALUES.

Year	Imports	Exports	Net Import	Domestic Tot. Exports	Domestic Tot. Imports
1850	173,599,526	94,753,493	78,846,033	134,600,233	268,599,466
1851	210,771,429	10,205,121	200,566,308	178,600,138	379,166,446
1852	207,440,598	12,053,084	195,387,514	154,931,147	350,318,661
1853	202,777,265	13,620,120	189,157,145	189,860,162	440,037,327
1854	207,822,029	15,621,460	192,200,569	213,085,226	409,277,015
1855	257,808,706	21,159,368	236,649,338	231,650,340	468,300,000
1856	310,434,310	14,781,372	295,652,938	266,430,051	562,082,989
1857	348,438,342	14,917,047	333,521,295	278,940,713	612,462,008
1858	356,338,654	20,660,241	335,678,413	251,351,093	587,029,507
1859	331,335,341	14,500,071	316,835,270	278,394,080	595,229,350
1860	358,016,110	17,533,404	340,482,706	305,440,627	645,923,333
1861	269,310,547	14,654,217	254,656,330	240,869,016	495,519,346
1862	189,336,077	12,265,477	177,070,600	170,444,044	357,514,644
1863	143,335,351	11,732,221	131,603,130	131,603,130	275,136,261
1864	116,447,283	15,333,091	101,114,192	101,114,192	217,261,475
1865	108,745,531	20,009,055	88,736,476	130,044,248	218,780,724
1866	104,596,110	13,341,450	91,254,660	124,800,131	216,056,791
1867	97,762,100	14,719,337	83,042,763	127,761,893	210,804,653
1868	107,436,440	12,594,099	94,842,341	129,390,000	226,236,341
1869	107,436,440	12,594,099	94,842,341	129,390,000	226,236,341
1870	107,436,440	12,594,099	94,842,341	129,390,000	226,236,341
1871	107,436,440	12,594,099	94,842,341	129,390,000	226,236,341
1872	107,436,440	12,594,099	94,842,341	129,390,000	226,236,341
1873	107,436,440	12,594,099	94,842,341	129,390,000	226,236,341
1874	107,436,440	12,594,099	94,842,341	129,390,000	226,236,341
1875	107,436,440	12,594,099	94,842,341	129,390,000	226,236,341
1876	107,436,440	12,594,099	94,842,341	129,390,000	226,236,341
1877	107,436,440	12,594,099	94,842,341	129,390,000	226,236,341

Further statistics enable us to add to the foregoing table the following one, showing our foreign trade for the first half of the current fiscal year in specie values.

1877.	Imports	For'n Export	Net Import	Dom. Tot. Exports	Dom. Tot. Imports
July	40,876,660	886,535	39,990,125	37,658,607	77,648,732
Aug.	39,947,343	981,719	38,965,624	41,735,121	80,700,745
Sept.	34,789,351	973,535	33,815,816	42,340,038	76,155,854
Oct.	42,015,173	1,434,449	40,580,724	45,572,949	86,153,673
Nov.	36,250,021	1,501,554	34,748,467	46,061,741	81,710,208
Dec.	39,530,159	1,195,064	38,335,095	50,071,456	88,406,551
Totals	223,715,078	6,974,411	216,740,667	319,240,804	535,981,471

Now, let us see what these figures mean. From 1850 to 1860 our foreign trade showed an annual increase which, though not steady, maintained a fair average. The drop from \$49,977,015 in 1854, to \$424,401,475 in 1855, resulted from the disturbances in Europe incident to the war of the Crimea, as the decline of \$28,779,905 in 1852, as compared with 1851, resulted from the agitation in Europe in consequence of the revolution of 1848. The fluctuations in 1858 and 1859 resulted chiefly from the panic of 1857 in this country caused by overtrading, and followed by a natural shrinkage in values. Our war began in 1861, and was followed by the enactment of the tariff approved March 2, 1861. This was a war tariff intended to yield an immediate and large revenue, and with various amendments, alterations and modifications it has continued in force ever since. That it has been in the largest sense a protective tariff is shown by its effect in developing American industry during the memorable ten years from 1860 to 1870, and yet in spite of this "Chinese wall" our foreign trade has gone on increasing, not with regular advances from year to year, but with a gain of \$60,634,262, comparing 1874 with 1862. The falling off in net imports since 1873 is, of course, due to conditions which restrict the consumptive capacity of the people. This is compensated by the increased export of domestic products and manufactures—an increase pronounced impossible by the free-trade theorists.

This comparison of annual totals will perhaps surprise some of our readers, but when the subject is carefully considered there will be found no occasion for surprise in the fact

that a protective tariff does not exert an unfavorable influence upon the foreign trade of a nation. By diversifying industry, increasing the earnings of labor, promoting the development of natural resources and appreciating values, it increases the prosperity of a nation, and while creating new wants provides the means of satisfying them. Had it not been for our tariff the ten years following the war would have been years of prostration and dark misfortune. Domestic industry would have struggled against hopeless odds, handicapped as it was by heavy taxation, and it is doubtful if we could have sustained our national credit or preserved our national integrity. The tariff has changed the character of our foreign trade in some respects, but it has not stifled it nor retarded its healthy and normal development.

The figures given above vindicate our remarks of last week with regard to the probable effect of the proposed Chilean tariff upon our commercial relations with that country. Were the amount of our exports of manufactures dependent upon free trade with foreign markets, we should have small chance for success. On this subject the *Saturday Review* says: "Abstract reasoning has, curiously, little influence on a large part of the public. Nothing could be more complete than the theoretical argument in support of free trade, and it seemed to have been taught in this country, from the press and the platform, with a success which placed it beyond further questioning; but no sooner are we tried by four or five years of commercial depression than it is found that by large and powerful classes the lesson has never been intellectually mastered. Abroad opinion is yet more unfavorable. On the Continent of Europe protection reigns supreme. Even in France, where the advantages of increased commercial intercourse have been proved by experience, the protectionists are able to divert to their own purposes an inquiry instituted for political ends. In Germany also there are strong symptoms of backsliding; while in Austria, Hungary, Italy, Spain and Russia free trade cannot even obtain a hearing. In the United States, again, the opponents of outside competition hold their own; and in our colonies jealousy of the British manufacturer prevails over all other considerations. Of course this general rejection of our example and teaching reacts powerfully at home, so that even so distinguished a leader of the Anti-Corn Law League as Mr. Bright himself points to the 'exclusiveness of foreign tariffs as a serious danger to our prosperity.' Notwithstanding all this, the statistics of British foreign trade show that it has doubled in magnitude during the past twenty-two years, and that it has increased largely even with those countries which have the highest tariffs. The wisest economists are agreed that the depression of the last four years has been caused not by tariff legislation favorable to home industries, but by the destructive wars of the past and the burdening of nations with mountains of debt. Whether it is profitable for Great Britain to continue the policy of free trade is not for us to decide. Certain it is, however, that she stands practically alone, and suffers all the disadvantages of unrestricted foreign competition with none of the advantages of reciprocity. We need be in no hurry to put ourselves in the same position.

Elevated Railroads in Cities.

For some years past the city of New York has had an elevated railway in successful operation. Recently a new elevated road has been opened, and the first road has completed its double track from Central Park to the battery, which gives the city two "rapid transit" roads with double tracks. The experience gained in these important undertakings is likely to be of great value, not only in the future development of New York, but of all other large American cities. Through the stubbornness of the street railroad companies, the horse interest and the conservative element of the community, it seems improbable that steam on surface roads will have a fair trial on those portions of our cities where it is most needed. The elevated road has taken the public attention, and it is quite probable that for some time roads of this kind will be most popular. The objections to the elevated roads that have been urged with most vigor in the fight which has been made against them are, strangely enough, not those that have any real existence. The frightening of horses is now an insignificant matter and scarcely ever occurs. The fall in the value of adjacent property which was anticipated has not been realized, and, on the contrary, it is now rumored that along the line of one road, at least, stores will bring higher rentals than before the road was built. The noise on the first road erected was reduced to a minimum, and the trains do not cause as much annoyance as an empty ice cart or truck passing through the street at a trot. The Gilbert road, however, is a nuisance in this respect and makes a great racket. This is partly owing to faulty design and partly to heavy cars. The dropping of tools, coals, the leakage of oil, and the cinders thrown from the engines are very serious matters and justly cause much complaint against the new line. Much of this is owing to the inexperience of the officers in a branch of railroading which develops a thousand new conditions. None of the troubles are insur-

mountable in the construction of a new road.

With New York's experience as a guide, it is not difficult to come to some very valuable conclusions in regard to the usefulness of elevated roads. As a relief to narrow and crowded streets they are invaluable, and answer perfectly the end for which they are intended—taking the through traffic and leaving the surface roads with only the "short fares" to deal with. If properly constructed they can be put in the narrowest streets without difficulty. In wide streets they can be put in the middle of the street, as in Third Avenue, without being obstructions. The shade which they give in the street is by no means an insignificant addition to the comfort of both man and beast passing below. In the matters of noise and freedom from obstructions to the street, the single column road is far superior to the so-called Gilbert road, and although we have not the exact figures in regard to the quantity of iron used and the cost of erection, the single column is doubtless greatly superior to the cross-girder system. Were the reverse true the single column style would still be vastly preferable. By judicious selection of routes almost any given location in a city can be reached, and by the use of long and short columns grades may be reduced so as to be easily within the power of the dummies employed. For this kind of work experience in New York points to the fact that the hardest of anthracite is the most desirable fuel in order to reduce the cinder and smoke nuisance to a minimum. In this city stations are located at the intersections of crossing lines of horse cars, upon the most important of the crossing thoroughfares and at points nearest great local centers. While the speed of the trains is by no means great, it is ample for the work, and makes it possible to more than double the size of our largest cities without increasing the time consumed in passing between the residences and business portions. In this city the cost of the roads has been high for various reasons, the opposition of the property holders being among the chief.

One of the principal changes likely to be produced by the elevated railroads is the introduction of what may be termed two-story streets. Already some of the larger stores in the vicinity of the depots are talking about connecting their second floors with the platforms of the stations. There seems to be no reason why this should not be done all along the street, so as to make a second sidewalk at the level of the rails. The advantages of such an arrangement would be very great. The lower sidewalks would be permanently protected, while the second floors would have advantages in the way of light much superior to those upon the surface. Altogether it is quite probable that within the next ten years the internal economy of New York city will be very materially changed by the introduction of the elevated railroads.

Proving Chain Cables.

We print in another column a communication from Commander L. A. Beardslee, U. S. N., upon the proof strain of chain cables. There are few articles in the whole range of mechanical construction upon which more implicit dependence must be placed, and upon the perfection of which human life and property is so largely risked. A flaw in a chain cable not unfrequently works as serious a loss of life and property as a boiler explosion. To the merchant marine and the navy, sound, strong chain is of the highest importance. At a very early day this was recognized, and many years ago the strength of chain cables was made a subject of investigation. Tables showing the amount of strain which good cables ought to be able to bear were then made, but unfortunately these tables are incorrect, and in some cases worse than useless, since they impose strains which are greater than the elastic limit of the metal, and which in chain of the larger sizes do serious and permanent injury. Up to the time when the United States Board undertook the investigation of the subject, the only information obtainable was that derived from the British Admiralty proof tables and the less known United States tables. Commander Beardslee points out very clearly the fact that the former are incorrect, and that even the latter are not wholly accurate, although the strains imposed are not above the limit of elasticity of the metal. This paper will, we hope, put an end to severe tests called for by the Admiralty tables. The importance of the knowledge gained by the United States Board during its experiments, and the pressing need which the public has for the results of these experiments, put in such shape as to be immediately useful, should be great enough to induce Congress to make the necessary appropriations for completing a work which has been so well begun.

In passing sentence on Chase, the defaulting mill treasurer of Fall River, the judge made some very sensible remarks. He said that the crime established in this case was one of the most dangerous to the welfare of the community, and could be committed only by persons holding high trusts, and such conduct was demoralizing to those holding less important trusts; that he was willing to agree that corporations ought to put a safeguard around the most trustworthy men that they might not be tempted; that he had no doubt the prisoner had undergone all the punishment necessary from personal considerations to himself, but it was necessary that something should be done

to deter others from the commission of such offenses.

A Business View of Certain Business Questions.

The address of Mr. S. S. Jewett as President of the National Association of Stove Manufacturers, which will be found in its proper place in our report of the meeting, contains many suggestive passages which, did time and space permit, we should be glad to discuss at length. Perhaps we shall find them fruitful texts for articles in future issues, but for the present we can give them only brief consideration.

Whether Mr. Jewett's congratulations to the trade on the adoption by manufacturers of a cautious and conservative policy, leading them to restrict production within the natural demand of the market, are warranted by facts, is a question on which it is probable there will be found room for differences of opinion. In one sense Mr. Jewett is right. Probably the manufacturers are not generally carrying many of last season's goods, but it does not follow, considering the means adopted in many cases to get rid of them, that the relation between production and the actual consumptive requirements of the country has been as close as a good business policy would have dictated. The existence of a healthy relation between them is not indicated by the prices at which manufacturers have been content to sell goods during the past year. We do not, as the rule, trouble ourselves to find out what manufacturers are really selling for, but we have given some attention to the cost of manufacturing, and have learned enough about the prices at which many stoves are sold to satisfy us that many manufacturers have either knowingly or ignorantly sold for less than net cost. We express our honest convictions when we say we do not believe a majority of our stove manufacturers know what their goods actually cost them. Indeed, we have proof that cost is often widely miscalculated. This is too large a subject to discuss briefly, but it is one of great practical importance, and one which should receive full and intelligent discussion at the next meeting of the Association. Mr. Jewett may be correct, and he is certainly sincere, in what he says on this subject, but we think there is room for very much closer adaptation of production to consumption without entailing the danger of a scarcity of stoves, or an advance in prices which will yield manufacturers profits disproportionate in largeness to the amount of capital required in their business.

With regard to the improvement in the character of stoves during the past half year, Mr. Jewett is undoubtedly correct in what he says. It is a complaint often heard that we have a great deal of change with very little real improvement in stoves. We cannot discover that this is warranted by facts. Certainly the inventors of useful improvements cannot complain that they are not appreciated and adopted by the trade, however much they may complain of the difficulty they experience in securing a recognition of their moral and legal rights. We believe that a majority of our manufacturers honestly desire to improve their goods as rapidly as possible, and to make each season's product better than the last. In this they are measurably and sometimes conspicuously successful; but we are compelled to admit that comparatively few stove manufacturers give proper attention to the study of the laws of nature which govern combustion and control the workings of a stove. It is not unusual for a manufacturer to make or purchase a set of patterns and proceed to manufacture a large stock of some new stove without a single experiment or test. If it works well, so much the better; if not, they change it. We are of the opinion that there will not be much longer any room for empiricism in stove manufacture. It will be with that as with most other industries—science will take the lead and keep it, notwithstanding the fact that, as a class, stove manufacturers affect to hold theoretical knowledge in light esteem.

Mr. Jewett's strictures upon the mistaken policy of forcing the sale of goods when none are wanted, are timely and judicious. The healthiest conditions of trade are found when stocks are carried nearest to first hands. The manufacturer then knows how to adapt his production to the needs of his trade. The fact that goods which have passed from first to second hands are practically no nearer consumption than before this transfer was made, is commonly lost sight of by manufacturers. The mistake of the dealer who buys goods he does not want when he buys them, invariably reacts upon the manufacturer.

What Mr. Jewett says about convict labor unquestionably expresses his own views and those of a majority of the trade. We are, however, compelled to say that what he points to as the end and aim of the anti-contract movement is practically impossible of attainment. If they mean to repeal the laws authorizing the contract system they are working for something practicable if not desirable; but the time will never come when it will be possible to lease convict labor at a price approximating that which skilled labor commands outside of prisons. It is not worth as much and never will be. We lately visited some coal mines in Georgia which are largely worked with convict labor, for which the contractors pay \$11 per year per man, and yet the company are seriously discussing the desirability of terminating the

contract as unprofitable and employing only free miners, whom they cannot expect to get for less than \$11 per week at the very least. A man is a man, but it makes a difference whether he works as a journeyman or an apprentice; whether he can be retained or discharged at will, and whether the employer can control him or is dependent for the discipline and order of his works, and the industry and conduct of his men, upon some official who has no interest in his business and cares not whether he succeeds or fails. There are two sides to this question, and it is well that both should be heard. When the State charges for the labor of its convicts the market value of labor outside prison walls, it will have no bidders though it offer every other possible inducement.

Mr. Jewett's concluding remarks about artificial obstructions to recovery growing out of reckless legislation and partisan strife, reflect the almost unanimous sentiment of the business community. We commend them to our readers as sensible and sound. Indeed, the whole address is admirable, and we congratulate the Association upon having so long retained the services of so competent a president.

The public meeting lately held by the workmen of Milan, Italy, to give expression to their earnest demand for peace, is a significant indication of a growing determination on the part of the people to assert their right to life, liberty and prosperity. The societies marched to their place of assemblage, organized a meeting and went regularly to business. The speakers denounced war as barbarous and inhuman, as destructive of life and property and as entailing grievous burdens of debt to be paid from the earnings of labor. As an earnest of their sincerity the meeting approved and ordered telegraphed to the Czar of Russia and the Queen of Great Britain and Ireland the following message: "The Italian committee of workmen exhort you to avoid war and submit the Eastern question to arbitration." When the workmen of all nations have become equally wise, wars will cease. Kings and cabinets will be powerless to make war unless supported by the will of the people, who are easily fired with enthusiasm and who often mistake a national crime for a vindication of the national honor. We fear it is too soon to hope for a realization of the prophecy that

"—the common sense of most shall hold a treacherous realm in awe,
And the kindly earth shall slumber, lapt in universal law."

but its fulfillment rests with the masses of the people whose over-readiness to bear arms and use them against their own best interests renders war possible.

In our last issue the value of the two important tables showing the general foreign trade of Great Britain in 1875 and 1876, introduced in our editorial entitled "Fluctuations in England's Trade Since the Panic," was unfortunately marred by a typographical error. In the heading it was announced that the amounts were stated in "thousands" of dollars. We should have said that they were stated in millions of dollars. The error was an obvious one to statisticians, but might mislead those unaccustomed to the study of figures.

We print elsewhere an interesting communication from Mr. J. H. Winsor, our consul at Sonneburg, Prussia, on labor, wages, cost of living, business and finance in Brandenburg; also a similar communication from Mr. Fox, our consul at Brunswick. These communications give a very accurate account of conditions existing in Germany which have an important bearing upon our trade relations with that country.

We begin this week our notes of important American and foreign exhibits at the Paris Exposition. The brief introductory remarks of our correspondent are of much interest to exhibitors from this country, and we hope they will not fail to receive attention.

From our consular reports it appears that Italy as well as Switzerland offers a profitable market for American anthracite. We give in this issue a report from Mr. Spencer, our consul at Genoa, and extracts from a letter from Col. John W. Forney, both upon this subject.

The Brazilian government has been compelled to bolster up its credit and replenish its empty treasury by having recourse to the dangerous expedient of an issue of paper money. The treasury was empty, the revenue was insufficient even to meet the running expenses of the departments, a loan could not be placed abroad except at terms almost ruinous to the credit of the country, creditors refusing to accept treasury notes in payment for their claims on the government, and the famine-suffering people of the north were in sore need of further assistance. To meet these demands the Ministry recommended a further emission of paper money, and this emission was authorized by the Council of State and announced by decree on the 15th instant. By its terms the new issue will amount to \$30,000,000 (60,000,000 reals), and will be put into circulation during the fiscal years of 1877-8 and 1878-9, 6 per cent. of which will be called in and destroyed each year thereafter. This increases the amount of paper currency in Brazil to about \$100,000,000, and whether it will

bring anything more than temporary relief is a question upon which there is a wide difference of opinion. Exchange thus far has been affected very little by it, owing to the redemption clause in the decree, but should anything occur to weaken confidence in the government, it is certain that Brazil will suffer seriously from this act of inflation.

THE PARIS EXPOSITION.

Some Notable American Exhibits.

(From our Special Correspondent at Paris.)

Probably the readers of *The Iron Age* have heard so much about the opening ceremonies, the crowds of visitors, the disorder and the confusion of the Paris Exposition, that your correspondent does not need to occupy space with any general information of this kind. I wish, however, to call the attention of exhibitors from the United States to the fact that, as the rule, they are very imperfectly represented, and that the benefits they are likely to derive from exhibiting will be small unless they adopt a better system of dispensing information concerning their wares. At the date of this writing (June 11) many exhibits are not yet ready, and at those which are in position it is almost impossible to find any one who can give you the least information. They are either in charge of nobody, apparently, or the attendants are "doing Paris," or those who have them in charge know nothing whatever about them. At some of our largest exhibits one cannot obtain a card, circular or catalogue. This is all wrong. Visitors come, look, ask a few general questions of whoever happens to be around, learn nothing, shrug their shoulders and walk away. Were it desirable I could give the names of a great many American exhibitors whose costly and elegant displays might as well be set up in the middle of the Sahara for all the good they will do to American trade. They naturally attract attention, but the absence of any information concerning them prevents those who are interested from satisfying even a natural curiosity to learn something concerning them. I would suggest that, so far as possible, every firm making an exhibit here should be represented by a responsible person—a principal if possible—who feels enough interest in the object of the exhibition to see that proper attention is paid to visitors. Circulars, descriptive pamphlets and catalogues printed in French should be accessible to all who want them—with, of course, a judicious intelligence in their distribution. The quality and price should be given, and as many particulars about their manufacture as is likely to be of public interest. *The Iron Age* Library has been useful in supplying this information, but it should not be a sole dependence. Possible customers must be sought and interested by those with goods to sell, and this can best be done by supplementing an attractive display by the dissemination of information concerning it. Those who appreciate this most fully are likely to find the exhibition most beneficial. With this brief introduction, which I hope will not be without effect, I will proceed to describe such of our exhibits as first appear in my note book:

A. FIELD & SONS,

Taunton, Mass., and 78 Chambers street, New York, is not only very attractive, but very interesting just at this time, when so much has been said in some English journals about the asserted superiority of American tacks. It has been carefully examined by a large number of gentlemen interested in the manufacture of tacks and nails, and great anxiety is manifested to learn the details of the process of manufacture and the means by which such sharp points and broad heads, without weakness at the joining of the head and body of the tack, are secured. The arrangement of the exhibit shows great ingenuity and skill. The firm occupies a space of about 22 by 6 feet, on which they have erected a handsome structure composed of glass cases resting on nests of drawers and surrounded by a rosewood railing. In the center of this structure, and resting on the cases, is an elaborately carved picture frame about 18 feet long and proportionately high, showing on one side an excellent painting of their works. On the opposite side of this picture is a display that is as beautiful as it is unique. On a large canvas is a picture of the American eagle with flags, shield, &c., surrounded by stars in brass tacks. All the lettering on this card and all the ornamental scrolls, of which there are several, are done with tacks of different kinds and colors. To give some idea of this piece of work we copy the lettering, which is as follows: "A. Field & Sons, Taunton, Mass., manufacturers of copper and iron tacks, carpet, brush and gimlet tacks, tinny tacks; lining and saddle nails, tufting nails and buttons, shoe nails; patent coated tacks in colors, red, green, blue, drab, brown and maroon, glaziers' points;" and in handsome scrolls, "japanned lining nails, common and patent brads, annealed trunk and closet nails, hob and Hungarian nails." The lettering on this card is handsome and the display type is well balanced. The immense variety of tacks, &c., used is worthy of notice, and the fitness of the tacks to the sense they convey has also been happily carried out. Tastefully arranged in many colored paper boxes in the surrounding glass cases are samples of over 2042 varieties of tacks and nails, japanned, self-color, blued, galvanized, tinned, brass, copper, &c., embracing 2300 lots. This house was established in 1827, and the daily capacity of their works is over 50,000,000 pieces.

The only exclusive exhibit of American cut nails is that of

MORRIS, WHEELER & CO.,

of Philadelphia, which includes samples of every size of cut nails and spikes made, from the 2d. fine and 7/8-inch cooper nails up to an 8-inch spike. They are very taste-

fully arranged in semicircles on a board which forms the background of their exhibit. At the base of these boards are a number of small bins containing some of the most common sizes of nails for distribution. The nails, in shape and finish, fully sustain the reputation of our American manufacturers. Some specimens of the chisel-pointed nail, for which this firm has the exclusive right of manufacture in the East of the United States, and Shoenberger & Co., of Pittsburgh, in the West, are also shown. The claims of this nail have already been fully set forth in our columns, and the difference between them and the common nail in its action on wood illustrated. The annual product of this firm is 6000 tons, or 120,000 kegs of nails.

The exhibit of horse-shoe nails, pointed, polished and finished, of

THE GLOBE NAIL CO.,

in the Agricultural Section, is attracting a good deal of attention. The nails are freely given to those who are interested in them, and the expressions of admiration of their finish, smoothness and uniformity is universal. Those who examine them further will find the material of the nails—cold-rolled iron—to be of the very best quality, showing a hard, close fiber, which gives stiffness and permits of the use of a thinner and lighter nail, and their ductility allows the finest clinching. The process of manufacture secures uniformity in length, width and points. In use it is claimed that their smooth, polished surface to a great extent prevents the usual splitting and mutilation of the hoof, thereby saving considerable time that would otherwise be consumed in driving. In case "pricking" occurs from the remnants of an old nail in the hoof, which will sometimes happen notwithstanding the utmost care, it is claimed that these nails do not produce inflammation, as would an uneven, rough or scaly nail.

A. G. DAY,

Seymour, Conn., and 120 Broadway, N. Y., exhibits samples of the Kerite insulated telegraph wire and cables. Kerite is a very flexible and, as is claimed, a practically indestructible compound for insulating telegraphic wires and cables. The French Commissioners to the Philadelphia Exposition in their report say: "The coating of the wires (and among them he exhibits some of an extreme fineness) is of great pliability, and possesses perfect insulating properties. We took one of his wires, covered with a coating of 1-30 of a millimeter, and plunged it in water containing 10 per cent. of sulphuric acid, without its being injured in the slightest degree by this contact. These wires possess the great advantages of not becoming brittle or porous, and of being able to withstand the different actions of air, light and water without any injury. We examined specimens of these wires which had been in use for upward of two years, the authenticity of which was vouched for, and found no apparent traces of depreciation."

T. SHIVER & CO.,

of New York, exhibit four cast-iron piano frames cast by them for the well-known piano manufacturers, Decker Bros., Hazleton Bros., Steck & Co. and Albert Weber. Two are finished in bronze and two are as they came from the mold. To those who know the great difficulty in making thin castings of the size of these pieces the success is a constant marvel. The castings are true, no warping, the edges straight and the flat surfaces as smooth as though rubbed with emery. An English gentleman who examined them with us would scarcely credit the evidence of his own senses. Our American light castings are a constant wonder to foreigners. This firm also exhibit in Machinery Hall a number of samples of letter presses.

THE SNELL MANUFACTURING COMPANY,

of Fiskeville, Mass., exhibit a case of beautifully finished augers, reamers, screw-drivers, bits and some samples of handled gimlets. The augers are from one-fourth of an inch to 2 inches in diameter, and from 6 to 30 inches long. They also exhibit two of Snell's patent boring machines.

DEVIN BROS. MANUFACTURING COMPANY,

of East Hampton, Conn., make a large and very complete display of bells. In strapped sleigh bells their assortment is immense, with a variety in their finish that will suit all tastes. They also show a large variety of hand bells and handled dinner bells, both plain and plated, table, hall and locomotive gongs, toy, house and car bells, and a variety of bells for electrical machines. In addition to bells they exhibit brass and bell metal kettles, waffle irons, &c.

There are but two displays in the line of brass goods for upholsterers' use in the interior of buildings, especially of stair rods and cornice poles, which received such flattering commendations from the English Commissioners to our Centennial Exposition.

W. T. & J. MERREREAU,

321 Broadway, New York, make quite a good display, including in the lines mentioned a large number of beautiful and artistic patterns of stair rods in various shapes in brass, several colors of bronze and in nickel. For stair service they also show stamped brass in neat and graceful designs for covering the edges of the steps to prevent wear. Three wooden steps with this covering form a part of their exhibit. For curtains and window drapery they show some beautiful styles and patterns of cornice poles and rings for the same, with knobs and hooks of brass, bronze and gold, silver and nickel plate. Other manufactures of this house, such as dog collars, brasswork, &c., are shown. The whole exhibit is very neat and attractive.

M. GOULD'S SONS,

Newark and New York, exhibit a line of fine brass goods, such as stair rods, chains, dog collars, &c., together with a large variety of trunk hardware. The stair rods are in a number of patterns, flat, oval and round and of beautiful design. The trunk hardware is in great variety, including stamped zinc and brass for covering; iron corners, plain, black and galvanized; trucks or rollers, iron and brass nails, handles, locks in great variety, catches, &c. The French trunk makers would do well to examine

these appliances, for of many of them they seem to have no conception. A number of dog collars are also shown, both of sheet metal, chains and embossed and metal-bound leather.

The only American glass exhibit is contained in a small case shown by the

MERIDEN FLINT GLASS WORKS,

Meriden, Conn., and consists of a few sample goblets and wine glasses. The manufacturers of American pressed ware have made a great mistake in not exhibiting full lines of their manufactures. A large export trade could be built up in these goods. Pittsburgh manufacturers have already sent invoices to Europe, most of which was for re-export. One house has quite a large trade with Europe in tumblers and goblets, and in champagne some business is done. A full exhibit of these lines of goods would have been of great advantage to our manufacturers.

W. & B. DOUGLAS,

Middletown, Conn. This old and well-known house, whose works were founded in 1832, show 350 sizes and styles of cistern, yard and force pumps, both hand and power, hydraulic rams, garden engines, yard hydrants, street washers, grindstone frames, &c. Their space, though covering over 1000 square feet, is hardly adequate to show the goods to advantage, and yet the pumps have been so arranged as to give any one an idea of the exhibit by a passing glance. To the front is placed the hydraulic ram, which, although originally a philosophical experiment of Mongolfier's in 1794, was first reduced to a practical machine by this house. The working model is of glass, which shows the whole machine, thus demonstrating to the most incredulous that there is no hidden pump, which many deem to be the case. From morning until night this little machine is surrounded by a curious crowd, who cannot conceive how, with 6 ft. fall, this little article elevates the water to a height of 40 feet, apparently with no force applied. Arranged on 20 different sample stands, each containing a different family, we find the well-known "Douglas" cistern, pitcher and small house force pump, for which this house is so justly celebrated, constructed both in iron, brass, copper and glass, to meet the wants of buyers from all parts of the world to which these goods are sent. Among the novelties shown we cannot pass without mentioning the pendulum pump, made in such a manner that by simply opening or closing an air plug the pump is adapted to force or lift. By this construction a simple crank shaft is made to do the duty of the usual heavy stand and brass rods, which make such heavy work in the old style of force pump. The "pendulum" is claimed to be by far the easiest working force pump made. Against the wall are placed their regular styles of lift and force pumps, both single and double acting, of iron and brass, which are too well known to need any detailed description. However, we could not help noticing the double-acting "B" pump, with detachable valve plate, by which the valves are reached for repairs without disturbing the suction or discharge pipes; this strikes us as a long-needed improvement in pumps. The exhibit includes no less than 50 different styles of yard and engine yard pumps, all of the most improved pattern, which for finish are unsurpassed. We were also shown a new pattern of yard hydrant and street washer, which is so constructed that the water can be cut off, and valves removed for repairs, without digging up the whole affair, as in the more ancient styles. Besides the above goods we were shown pumps for ships, windmills, quarries, factories and other uses too numerous to mention; in fact, no one has a want in the pump line that this house cannot supply. So well known is the "Douglas" pump on this side the water that foreign manufacturers do not hesitate to copy them, and in some cases even print in their catalogues that their goods are made after the Douglas system.

To an American who knows the value and the superiority of chilled cast wheels of good make, such as are easily obtained in the United States, the criticisms of foreigners on these wheels are very amusing. It is assumed that a cast-iron wheel must be weaker than a wrought-iron one because the tensile strength of the former is less than that of the latter, and on this ground, without considering the special service a wheel has to perform or the behavior of cast wheels under this service, they are condemned without a trial. If you show the records cast wheels have made; if you mention the fact that rarely, if ever, has there been an accident on a railroad in the United States from the use of these wheels, and this notwithstanding the very severe frosts of the northern part of America, while in England some of the worst accidents have occurred from wrought iron or cast steel tires breaking in frosty weather; if you mention that Pullman cars constantly run through from New York to Chicago, 1000 miles, without rest, and often at speeds of 40 to 50 miles an hour, making in some cases 12,000 miles a month; indeed if you give any of the well-known facts about the use of these wheels in America and elsewhere, they are received with a well-bred stare of incredulity; for does not wrought iron show a tensile strength of 40,000 to 60,000 pounds and steel even higher than this, while the best cast iron shows only 30,000 to 40,000—*ergo*, steel and wrought iron wheels must be better. One reason for this lack of faith is doubtless to be found in the poor results obtained with chilled wheels made of European irons. In other cases it may be due to the method of casting, the inexperience of the makers, or to the use of inferior irons. But any one who will examine the evidence fairly can have but little doubt that chilled cast wheels are to be preferred to the wheels to which we have referred in comparison. The wrought-iron wheel, especially the English, is a good wheel and true when first made, but being of soft material wears rapidly, and after running 20,000 to 25,000 miles has to be turned true in a lathe, at a cost about equal to recasting an iron wheel, and the practice common in America of exchanging old wheels for new, makes the renewal of wheels about equal to recasting. On the other hand, as will be seen below, the life of a cast iron wheel is often 100,000 miles. Prominent American engineers claim this as an average, but even taking the Bar-

num Richardson Co.'s claim, (50,000 miles), the mileage of the cast wheel is nearly double that of the wrought. There is an impression current that for resistance to shocks and vibrations a soft metal is to be preferred; and as the peculiar service to which car wheels are subjected results in a series of sudden and constantly recurring shocks and resulting vibrations, it is assumed at once that a hard iron is not suitable. This is also a theory without proof. Indeed much of the experience is in opposition to it. The merits of chilled cast-iron wheels in comparison with wrought iron ones are nowhere more visible than in mountainous countries where the curves are sharp and frequent and the gradients steep, requiring the use of the brake the whole length of the descending grade. In South America, especially, the evidence on this point in favor of chilled wheels against both wrought iron and steel is overwhelming. The evidence from Canada is very important. The roads in that country are owned by gentlemen and operated by engineers whose sympathy and much of whose experience would be in favor of the wrought-iron wheel. The heavy snow storms and low temperatures of Canada are very severe upon any wheels used, and result in such tests as are utterly unknown in England. Under these circumstances the engineer of the Great Western R. R. of Canada puts the life of chilled wheels on his road at 160,000 miles. Some years ago Mr. A. M. Ross of the Grand Trunk road gave the preference decidedly to chilled cast-iron wheels over the English wrought iron. This evidence could be continued almost without end. Now, in view of this mass of testimony, it is rather ridiculous that so many well-informed men will from day to day stand before the exhibits of chilled car wheels mentioned below and declare they are unsafe and ought never to be put on cars. It is simply absurd, and only shows their ignorance of facts. The mass of people ought not to be expected to know these facts, but those who have the care of railroads entrusted to them certainly know better, if they do not they are derelict in their duty.

The most complete display of the American chilling irons, their ores and products, is that of the

BARNUM RICHARDSON COMPANY,

of Salisbury, Conn. It comprises specimens of several of the ores used in the manufacture of the celebrated Salisbury cold or warm blast charcoal irons, the irons themselves and a large display of car wheels. They also furnish, what is of more importance than a mere exhibit, some very valuable publications in which the mode of manufacture and the merits of chilled cast iron car wheels are set forth, together with records of service of wheels, and the admirable and exhaustive paper recording the examination and tests of this iron made by Prof. Thurston of the Stevens Institute of Technology. The Barnum Richardson Company are certainly entitled to the hearty thanks of all Americans for this exhibit, and regret is very often expressed that it had not been supplemented by a display of our rich ores used in the manufacture of pig iron Bessemer steel and merchant iron.

The Barnum Richardson Co.'s exhibit consists of ores from the Old Hill Mine at Salisbury, which has now become so famous, as well as from the Chatfield and Davis mines, and specimens of the Salisbury pig iron made from these, one piece of which is 100 years old, and chilled wheels. The ores exhibited include specimens of the beautiful stactitic and botryoidal formation, with their rich coating of polished black oxide, that are so well known as products of these mines, as well as massive lumps of the open, porous, easily-worked hematites of the Salisbury region of Connecticut. Specimens of the different numbers of iron broken to show the chill are also shown, together with sections and fragments of wheels purposely broken for the same reason. These are contained in a beautiful gothic, upright show case. In the rear of this are two pyramids of chilled wheels for railroad service from 22 to 42 inches in diameter, and wheels for trains or street cars 30 inches in diameter. There are also two piles of Salisbury pig iron of the various numbers broken so as to show the depth and character of the chill.

The wheels made by this company are too well known in the United States to need any description, and their record too high to need any praise. Owing, as they do, the ore beds from which the iron is made that they use and the furnaces in which it is made, they are enabled to secure a uniformity in their wheels that is of great value. By mixing the different ores, and in casting the wheels by mixing the different grades and numbers of iron, they are enabled to get toughness and strength combined with the degree of hardness necessary to stand the wear to which they are exposed. The chills shown by this company are remarkable, not only for their extreme hardness, but also for their close incorporation with the iron of the unchilled portion of the wheels.

In regard to the mileage of the wheels made by this company, they assert that from reliable information in their possession they feel safe in claiming 50,000 miles as the average service of 33-inch wheels under passenger cars. The reports of the Lake Shore and Michigan Southern Railway show that some of the wheels made of Salisbury iron have run as follows:

4 wheels averaged.....	185,040 miles.
2 " " " " " " " " " "	220,528 "
2 " " " " " " " " " "	198,967 "
2 " " " " " " " " " "	184,317 "
2 " " " " " " " " " "	175,203 "
4 " " " " " " " " " "	168,979 "

These are, of course, their longest lived wheels and are exceptional cases.

Messrs. Upson, Walton & Co., Cleveland, Ohio, have invented an application of steel wire rope which is likely to be of much value to railroad companies. It is employed instead of Manila for a switch rope or for wrecking purposes, in which service it has been found durable and strong. These ropes are made of the best crucible steel, and have proved themselves to be a valuable addition to a wrecking outfit. Some of the tests to which they have been submitted on the Lake Shore and other roads are said to be quite astonishing.

AMERICAN SCREW CO.,

Providence, R. I.,

**MANUFACTURERS OF MORE THAN 4000 VARIETIES OF PRODUCT,
AND INCREASING THE ASSORTMENT DAILY.**

Machinery employed contains important inventions recently patented, and which are designed to produce Screws at a **lower cost to the consumer** than has ever been attained.

All goods are distributed through the Hardware trade, to whom a liberal discount will be allowed.

INTERNATIONAL EXHIBITION. PHILADELPHIA, 1876.

(No. 235.)

The United States Centennial Commission has examined the report of the Judges, and accepted the following reasons, and decreed an award in conformity therewith.

REPORT ON AWARDS.

PHILADELPHIA, November 8, 1876.

Product: **Iron, Brass and Steel Screws, Tire and Stove Bolts, Rivets.**

Name and address of Exhibitor: **American Screw Company, Providence, R. I.**

The undersigned having examined the product herein described, respectfully recommends the same to the United States Centennial Commission for Award, for the following reasons, viz: **Being of a quality nearly approaching perfection, showing the highest attainment in this branch of manufacture.**

G. L. REED, Signature of the Judge.

Approval of Group Judges.

Daniel Steimetz,
Jas. Bain,
Chas. Staples,

G. L. Reed,
J. D. Imboden,

J. Dittenbach,
Dav. McHardy.

A true copy of the record. FRANCIS A. WALKER, Chief of the Bureau of Awards.
Given by authority of the United States Centennial Commission.

[L.S.] J. L. CAMPBELL, Secretary.

A. T. GOSHORN, Director-General.
J. R. HAWLEY, President.



After forty years' experience we offer to the trade our Centennial Screws, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at the same price as the old style screw.

The new screws will be packed in manila colored boxes with the new label covering end of box, and enlarged figures showing plainly contents.

To distinguish this screw we have adopted a trade-mark, which is also secured to us.

The accompanying engravings show the progress of making screw from the old blunt point to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all



1776.



1846.

Patented August 30.



1876.

Patented May 30.

COVERED BY TRADE MARK.

Section at Line A

Section at Line C D

Section at Line E F

Section at Line A B

Section at Line C D

Section at Line E F

Estimated to be FIFTY PER CENT. stronger than a Screw as Commonly made.

the strains of forcing the screw into the wood naturally concentrate.

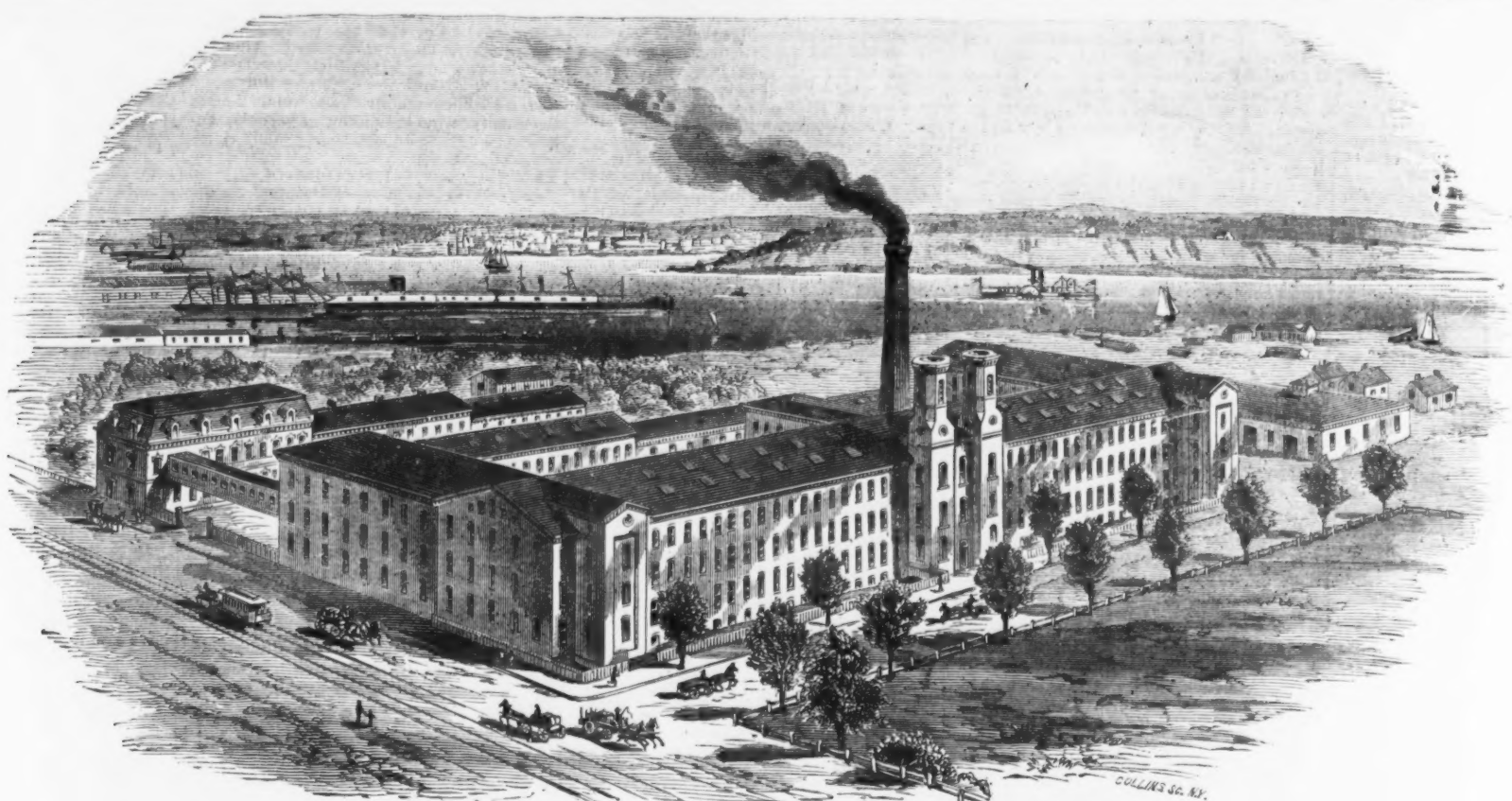
To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our new screw that not only is the sharp angle avoided, but the strength very much increased, as illustrated. See sections at lines.

CLAIM.

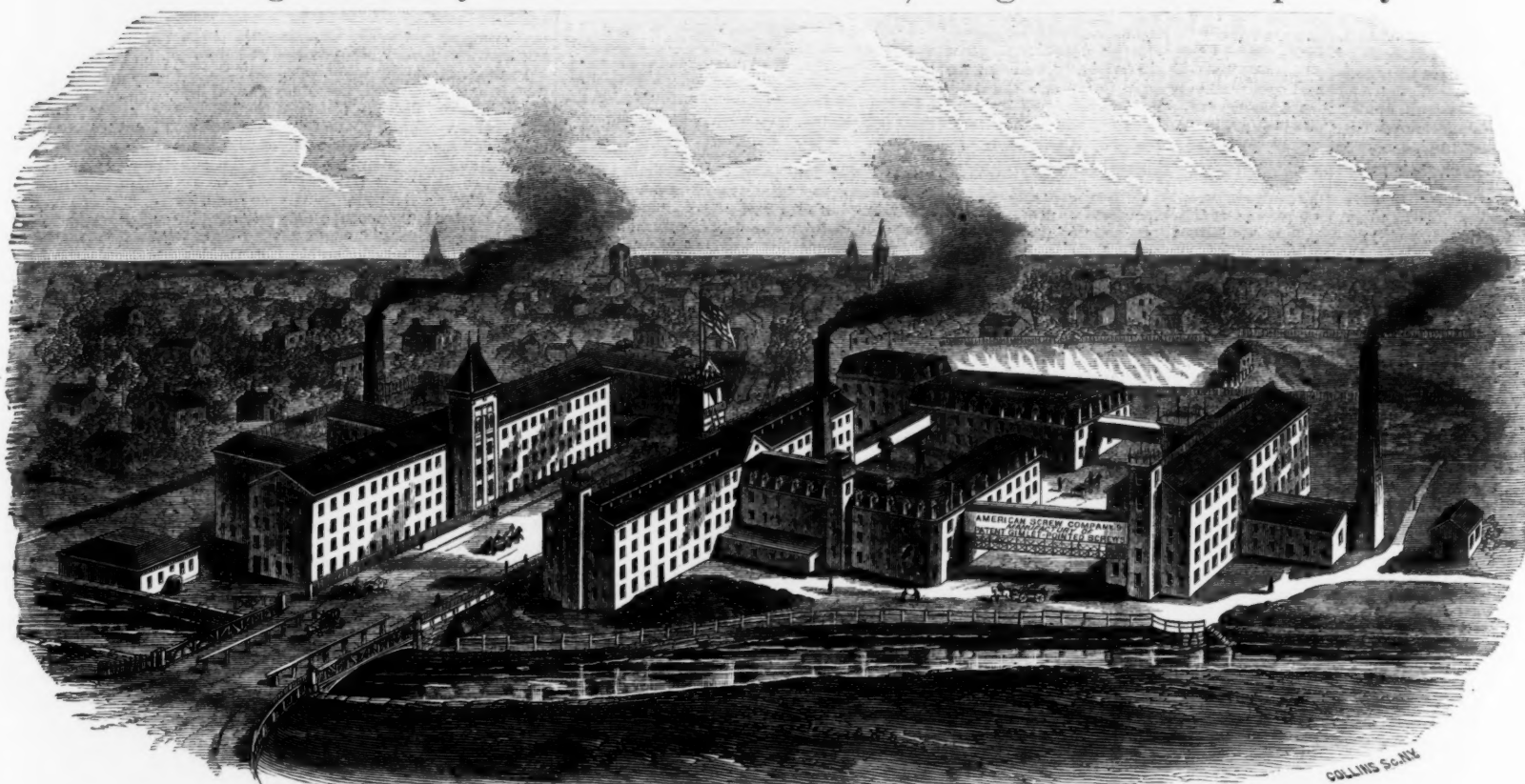
"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

On the opposite page will be found illustrations of the various Works of the company.



NEW ENGLAND MILL.

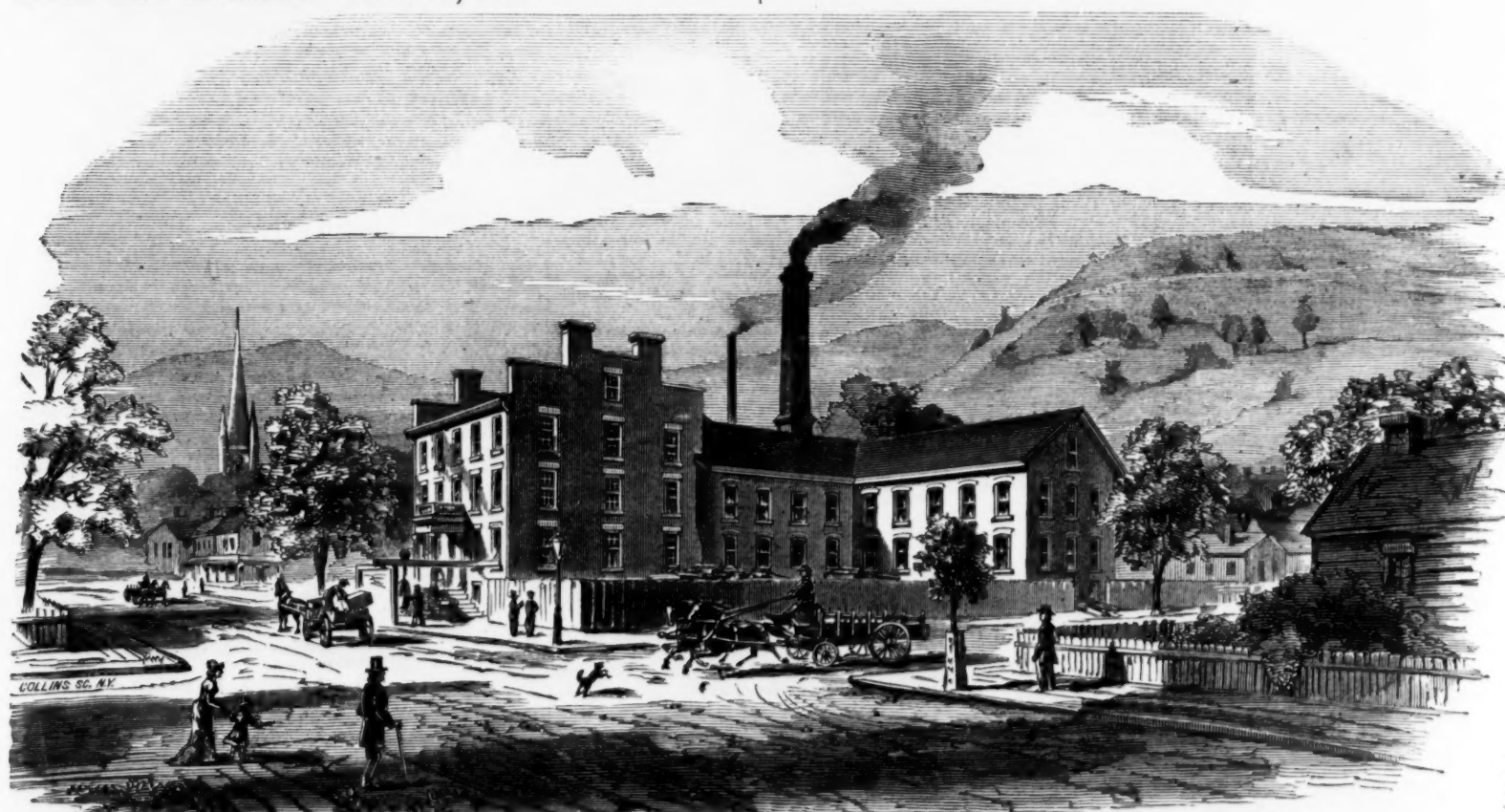
Containing Machinery for the Production of 22,500 gross of Screws per day.



BAY STATE AND EAGLE MILLS.

BAY STATE MILL,
For the Production of Stove Bolts, Tire Bolts, Rivets,
Lock and Machine Screws, &c.

EAGLE MILLS.
Capacity 22,500 gross Wood Screws per day



WORKS AT DUNDAS, ONTARIO, CANADA.

Capacity, 4000 gross Screws per day.

National Association of Stove Manufacturers.

The seventh semi-annual meeting of the National Association of Stove Manufacturers was held at the new rooms of the board of Trade, Cleveland, Ohio Wednesday and Thursday, June 19 and 20. The meeting was called to order at 11 o'clock on Wednesday by President S. S. Jewett of Buffalo. About 40 gentlemen responded to the roll call.

Mayor Rose and other guests were present, and the press was represented. After thanking the Board of Trade, who had kindly tendered the use of their rooms, the President delivered an address, from which we quote as follows:

Address of S. S. Jewett, President.

Gentlemen of the Association: Since our recent annual session in January we have passed over that portion of the year which usually develops but little of interest to us in the course of our trade as manufacturers. As far as my knowledge extends, a cautious policy has governed the production of stoves, restraining its volume within the natural demand, so that no unusual increase of stocks now interferes with our calculations for the future. In this respect stove manufacturing rests upon a basis more substantial than it has at any time during our existence as an organization. The views repeatedly expressed in various meetings by a large number of our members have taken deep hold upon the minds of all in our line, making it quite improbable that the production of stoves and ranges will exceed the natural demand for years to come. Health and vigor can now be seen where chronic disease and weakness formerly prevailed. The inexorable laws of supply and demand have compelled us to bow down before them and to recognize their inflexible power.

I am also positive that the character of the stoves manufactured has also been greatly improved, in many respects, to a degree equal if not superior to the progress made in any line of mechanical skill. The members of this Association do not remain idle, contemplating with egotistical satisfaction the style and quality recently in vogue among them, which are rapidly being adopted in outside foundries, where they fail to realize the advance in our art. But by contact with each other in our regular meetings we are more fully posted respecting improvements in stoves, and better able to gratify the cultivated taste of the present enlightened age.

The character of the times is faithfully reflected in the appearance of our wares which, like mirrors, show upon their surfaces that which is cast upon them, as altered by the medium through which it is transmitted. Consumers are no longer satisfied with the clumsy proportions and rude, ungainly ornaments of past years; they demand that perfect proportions and exquisite decorations shall be combined in these articles of necessity. It may be suggested that "history repeats itself," and that while some of us believe we are contributing to progress in designing our wares, yet soon it will all be rejected to revive what is now being abandoned. Let no manufacturer solace himself with such meditations unless he desires to be aroused from his slumbers only to see his trade lost, never to be recovered. Such hope must be laid aside to be supplanted by the ideas which are the fruit of our active times. Then the low level of stagnation will pass away from under us as we are able to step upon to the higher ground of prosperity.

Here is a fact that the whole trade will do well to consider: With no present overproduction, we find in the lots of manufacturers quite a number of old styles which, in addition to the large proportion of such goods in retailers' hands, makes in reality a surplus of the kinds now recognized as inferior or low grades. The retail dealers all say they have in stock enough of such goods, and need no more for a long time to come. While I am well aware that every dealer must keep in stock enough of them to supply a certain class of trade, yet it is also clear that less of them will be needed in proportion to the higher grades than ever before. Even if a dealer sells out all his inferior stoves he must buy more in order to cater to custom where he makes no money, and which for a year or two has been the larger proportion of the trade. People who could afford better grades have held aloof, not buying at all, until now they too are appearing in market, thus increasing the proportion of the demand for first-class goods, and compelling dealers to be extremely cautious in purchasing inferior grades. Dealers are carefully watching this feature, and will surely push the sales of higher grades of stoves which are now to be in great demand and on which they realize a fair profit. Manufacturers will do well to pay attention to this indication and draw from it whatever benefit this word of warning may contain. Let all bear in mind that improvements in proportions and ornamentation are the order of the day.

It affords me great pleasure to be able to congratulate you all upon the marked improvements you have made in the manner of advertising your wares. I might possibly mention this subject with regret, because I am deprived of the material for some humorous illustration or points for numerous jokes, yet it is much more agreeable to record this step you have taken in advance. No longer find the mails loaded down with grotesque caricatures, embracing all sorts of animals that never emigrated from Noah's Ark, and I also miss the duck, in frilled pants, standing by a nondescript pianist and bawling in plaintive tones the touching ballad, "Who Cares for Winter Now." This improvement has often been mentioned to me by parties who have no interest in the stove business other than as consumers; they expressed themselves so well pleased with the change as to convince me that the former oddities must have failed to accomplish that kind of advertising which increases sales. It also strengthens my opinion that the style you now use must be more satisfactory to you as manufacturers. It must show a more gratifying increase in the demand for wares, advertised in a manner consistent with the dignity of a respectable and legitimate trade.

There is, however, a feature in the selling of goods which seems to me unnecessary, and if abandoned the result would be beneficial to us all. I mention the matter with some hesitation, because of the extreme difficulty which the case involves. I allude to the strenuous efforts to push the sale of stoves at certain seasons of the year when there is no demand for them. The old practice of selling a full supply of goods at one time in order to forward them early to points then reached only in the summer, perhaps is no longer possible. Dealers can now replenish stocks promptly at any season of the year, and every effort to force sales at unnatural times only invites concessions in terms and prices, which could easily be avoided by ceasing efforts when there can be no desire to buy. I will mention an incident here which may not be quite pertinent to this point, but has a bearing upon the policy pursued by manufacturers toward each other in the selling department. A thoroughly reliable German, who is responsible for the cow story narrated by me at St. Louis, was visited by a representative of a stove house. The German welcomed him, and of course they were soon "talking stoves." The traveling salesman asked him what he paid "Smith" for their stove. The German adroitly stated the price at four dollars less than he actually did pay. To which the salesman replied, "I will sell you as large and good a stove 25 per cent. less." The German saw at once the absurdity of such a statement, and declined to buy any goods of the drummer. I mention this to show that illegitimate efforts and assertions impossible to prove cannot accomplish results favorable to those who undertake them.

The members of this Association have good reason to rejoice over the repeal of the bankrupt law, which takes effect September 1, 1878. Your attention was called to this matter some two years since, and recognizing its great importance, you at once responded with vigorous efforts to secure the repeal of a law which had been so perverted from its original purpose as to protect rogues in rascality of every description. Although success in such efforts seemed almost impossible, yet no energy has been lacking on your part. You have all, individually, collectively and continually, pressed forward in the good work, using every honorable means in your power to win the victory which has now perched upon your banner. Our triumph in this stubborn and protracted struggle teaches us that when we decide to employ our united strength to overcome any wrong we may be confident of final success.

The committee on convict labor have labored diligently since their appointment to arrest the attention of the public and interest all citizens in a matter which is working serious injury to the laboring classes. The leaders in every organization have had their attention called to the evil, and I believe, will all be ready to aid the people in asserting the individual right of every workingman—that the price of his labor shall not be interfered with by the farming out of prison labor, at famine prices, to scheming contractors. The laborers are aroused, and are rapidly organizing to present their claims to all legislative bodies in such a manner as to obtain instant recognition. The committee consider that their work has just begun, and they propose to continue to do all they can to push the matter to final success. I take pleasure in reasserting all that I said to you in January, but with regret that I then alluded to it in such moderate language. The time has arrived when each candidate for a seat in any legislature should be compelled to announce his views on this vital subject. No votes should be given for any man unless he has declared his intention fixed to put an end to the system. In every honorable way the effort should be continued vigorously and persistently. Remember your success in securing the repeal of the bankrupt law. You were the first organization to advocate the repeal, and your action has been stamped with the approval of the nation. Let us be active in this matter, no matter how long it takes, and work faithfully until the time arrives when we can say with pride: "Farming out of prison labor at prices less than honest labor receives is no longer possible."

Such is the natural situation of affairs, with every indication pointing toward a future bright with prosperity for our trade and for all the industrial classes. If among ourselves nothing is done to disturb matters, we are at the commencement of an era of progress which will carry us far beyond any point ever attained in our history as a nation, or that has ever been anticipated in the glowing prophecies of our Fourth of July orators. All classes will feel its impulse. Agriculture, mines, manufactures, commerce and labor will share in the universal advance, providing that we do not ourselves place artificial obstructions in the way.

It would at first seem absurd to suggest such a doubt, but incidents in our political life during the past two years have developed an undercurrent which was becoming so powerful as to alarm even the most conservative and profound thinking men of this country. It is not my ambition to appear as an alarmist, but I should fail to do my duty if I did not call your attention to this situation. As I am no partisan, I can do so free from political influence, solely from the standpoint of a citizen who is anxious for the welfare of his country and desires its prosperity above all other interests.

You are all familiar with the excitement which prevailed after the Presidential election of 1876 appeared to be involved in doubt, and how it was restrained by the appointment of an Electoral Commission, to whom both contestants agreed to refer the cases in doubt and to abide by the decision. This board was considered by the representatives of the people to be the only way to supply for the time what the constitution failed to provide; and it was accepted by the masses as a welcome relief from the agitation which had been so protracted and so disastrous to the business of the country. In their exalted capacity the Commission rendered decisions on all disputed points which were referred to them, and the Congress accepted them, thus terminating the political ferment. Immediately thereafter the electoral votes were counted by the President of the Senate, according to the terms of the constitution, and the result declared.

The President thus entitled to office was

duly inaugurated, without opposition other than occasional mutterings that the decisions were unfair and the title to the Presidency illegal.

Thus, with a President in office the country resumed its wonted quiet. In June, 1877, I said to you: "It is with profound gratitude that we here record that the political dangers which threatened the nation in January have yielded to wise counsels, and a peaceful termination of the Presidential struggle has restored and increased public confidence in the Constitution of the United States." Since then the laws of the land have all been faithfully executed as far as possible, in view of the fact that a few in the defeated ranks placed in the way every possible obstacle. There can be no doubt on this point that persistent efforts have been continually made to weaken the Executive power of the government. The idea was in print 13 years ago that the power of the President should be reduced, and that point has not been overlooked in the interval since. This was shown by the reduction of the army, and by measures tending to impair its efficiency. So the navy was permitted to fall into decay. Similarly a tariff bill was proposed, which could have no other effect than to lessen the revenues of the government, and also damage the industrial classes who uniformly support the government. It appeared also in the refusal to pass bills that would benefit manufacturing interests, and thus do good to the laboring classes. It appeared most decidedly in the resolution passed by the House of Representatives to appoint a Committee of Investigation. To have attempted at this late date to pass behind the scenes, and endeavor to unmask the actors in that political play, and expose their intrigues must have been inspired by some motive other than a desire to establish the merits of a case. There was a motive power engineering this movement, and it carried with its success or failure either disaster to the people on the one hand, or a continuation of general prosperity on the other.

The people were immediately aroused to a consciousness of their peril. The representative of each district was made to know that if the issue was carried to extremes, he would be held responsible for it by the laboring classes, who always suffer the most severely in times of popular tumult. Agitation of this nature, if pushed to extremes, would again fall heavily upon them, taxing their resources in the way of money, lessening their comforts, and even sacrificing their lives. It is they who rallied patriotically to fill the ranks of our immense army; from them came the multitude of those whose names are among the fallen.

All interested in the general welfare of the country, whether as merchants, manufacturers, or as capitalists realized the disastrous effects of another upheaval. They, too, became active and exerted their influence to overcome the dangerous tendency of the times.

Under this pressure on the part of all loyal citizens, the attempt has been foiled by the recent decisive action of the House of Representatives. This removes the apprehension which clouded the outlook for the future. I congratulate you that the continued prosperity of the country is now reassured.

The gratitude of the nation is due to Hon. Alexander H. Stephens and Hon. D. M. Key, who from their high vantage ground sounded the tocsin of alarm.

A serious drawback to the trade—and one which should be corrected as soon as arrangements can be made to that end—is the excessive modesty of its representatives. There is nothing more refreshing in business than the beautiful humility and the uncompromising antagonism to exaggeration for which every stove manufacturer is known; but these have their disadvantages. We live in an age of active and merciless competition—an age of recklessness and violence in trade—but the stove man is all unwitting of the demands of the times and clings to peace at any sacrifice. He never has in his manufactures features possessed by no other stoves; he never claims advantages over all competitors; he never hears him even whisper that he makes the best stove in the world. No, indeed; his statement is unvarnished, and he would no more think of saving a hundred per cent. in fuel and promoting comfort to an incalculable degree than he would think of making any other boasting representation. He does not claim to have produced the most perfect range in the world—not at all. On the contrary, he gives the inquiring purchaser the address of the manufacturer who has accomplished this extraordinary feat. His range never broils without odor, it is not a celestial light that comes through his plate of mica, and his nickel knobs and hinges are not worth more than their weight in gold to the buyer! No, your stove man is shrinkingly modest, even though his fortune takes to itself wings and flies away, leaving him poor, desolate and forlorn. He may meet a demand or fancy that he meets a want which every other manufacturer in the country has failed to meet, but he never breathes, even to his next-door neighbor, that he has given to the world the greatest invention of modern times, and that the age he glorifies owes him a debt of gratitude it can never repay.

The bare of our trade is modesty; and a carefully selected committee of this dignified body should give the matter thought and suggest a remedy for it. A scheme of penalty and reward might be framed, the impartial enforcement of which might go far to neutralize the effects of this growing evil. The universal habit among the gentlemen engaged in the trade of speaking well of the manufacturers of their contemporaries is absolutely ruinous in its consequences, and the many who do this thing should be regarded as highly censurable, and should be compelled to use their own cooking ranges in their families and to rely for warmth and comfort in midwinter upon the base burners of their own manufacture. I would not advise resort to such a severe penalty only in extreme cases, and where no doubt of guilt remained in the minds of those composing the tribunal charged with the responsibility of adjudication. I would not have the members of this Association deem me cruel in even suggesting so terrible a penalty as the one I have named, but you

will agree with me that desperate remedies are needed, and that the welfare of the trade ought no longer to be sacrificed on the altar of modesty. Let us hope that the time is not far distant when proper self-assertion, a confident and brilliant declaration of the unapproachable superiority of each manufacturer's wares, and a hearty and vigorous condemnation of every other man's products will usher in for us an era of prosperity, a very millennium of fraternal feeling and profit. Till that time comes we must suffer with what patience we may the embarrassments and annoyances growing out of the evils to which I have briefly directed your attention.

The address was received with numerous expressions of approval.

Mr. R. P. Myers, of Myers, Rouse & Co., then extended a hearty and cordial welcome to the Association on the part of Cleveland stove manufacturers.

Mayor Rose, of Cleveland, also offered an address of welcome.

The reports of committees being then in order, Mr. Isaac A. Sheppard, chairman of the Committee on Patents, to whom was referred the subject matter of the passage by Congress of a law to afford better security of property in patterns for metal castings, made the following report:

Mr. Sheppard's Report.

To the National Association of Stove Manufacturers of the United States—GENTLEMEN: In behalf of your Committee on Patents, to which was especially referred the subject matter of the passage by Congress of a law to afford "better security of property in patterns for metal castings," I would respectfully report that in January last, immediately after the adjournment of the Association, your committee met in the room of the president to consider the subject.

After consultation, Mr. Chamberlain and the undersigned were appointed a sub-committee to visit Washington and urge upon Congress the passage of the bill introduced by Mr. Saylor, of Ohio, at the request of the stove manufacturers of Cincinnati. At the time appointed I went to Washington, expecting to meet Mr. Chamberlain there but he was unavoidably detained at home.

I made an appointment with Mr. Saylor for an interview with the Chairman of the Committee on Patents, to whom the bill had been referred, and on the following day we met Mr. Vance, the chairman of the committee, and he introduced me to the sub-committee, to whom the bill had been referred for examination. The committee being engaged upon other bills taking precedence of No. 2022, I could get no definite time fixed for a hearing on the bill, and was informed that there would probably be no chance for a hearing for two or three weeks.

On Feb. 20 I again went to Washington and saw several members of the committee, but the bill was in the hands of the chairman of the sub-committee, Mr. Douglas, and I could not get to see him. After consultation with Mr. Saylor and several friends in Congress, I thought it best to prepare a circular letter addressed to the Chairman of the Committee on Patents, setting forth the reasons for asking for this legislation; this circular was printed and mailed to the chairman and each member of the committee; the circular bears date Feb. 28, a copy of which accompanies this report, marked "A."

After some correspondence with Mr. Saylor and other friends, it was thought best for me to go to Washington again, which I did on March 14, and succeeded in getting a day set apart by the committee for the consideration of the bill. The day appointed was March 19. I immediately wrote or telegraphed to the different members of our committee to meet me in Washington on the evening of the 18th. Mr. Dwight Richardson, in behalf of Mr. Richardson of New York, and Mr. Walter P. Warren of Troy, responded to my call in person, but the other members of our committee were unable to attend.

At the time appointed we appeared before the committee and presented the grievance of the trade in regard to the counterfeiters and pirates that rob us of our property. Various objections to the bill were made by members of the committee which we endeavored to remove. Eight members of the committee expressed themselves as favorable to some measure of relief, but could not support the bill in the form presented, and the bill was laid over for further consideration.

On leaving the committee room we immediately wrote to various members of our Association requesting them to write promptly to certain members of the committee, and also to their representatives urging the favorable consideration of the measure. On the following Tuesday (March 26) I again attended the meeting of the committee. Upon this occasion I was treated with marked consideration by the committee, inasmuch as they laid aside the general bill for revision of the patent laws in order to give me another hearing on bill No. 2022. The most serious objection presented upon this occasion was doubts as to the constitutionality of the measure, the opponents contending that Congress had not the power to pass the bill in the form presented, and that if it were passed the courts would decide it unconstitutional. It was contended that in order to reach the object desired the foundation must be laid under the clause in the constitution relative to patents. Mr. Cutter, a member of the committee, stated that he had been endeavoring to frame an amendment to overcome the objection, but had not fully succeeded in satisfying himself in the matter. It was evident that the letters written by the manufacturers from the different sections of country had produced a favorable impression. The chairman and other members of the committee had been in consultation with the Commissioner of Patents in regard to the bill, and there seemed to be a general desire to give us protection, provided the bill could be amended so as to overcome the constitutional objections.

I was recommended to an attorney of great experience in patent law as a suitable person to get the bill put in such a shape that the committee could report it with a fair probability of having it become a law. I conferred with the attorney and he undertook to frame a bill to meet the case. On

March 29 I again went before the committee, and Mr. Vance, the chairman, offered the bill thus prepared as a substitute for the original bill, but that did not prove acceptable to the committee. Several members of the committee had been in consultation with the Commissioner of Patents in regard to the bill, the commissioner agreeing that some remedy ought to be found for the evil complained of, but to get it in proper form seemed to be the great question. The further consideration of the bill was postponed in order to hear more fully from the Commissioner of Patents. I attended the meeting of the committee on April 5 and 12. The committee finally agreed upon a bill as a substitute for the original bill, a copy of which accompanies this report, marked "B," and the chairman was authorized to report it to the House with a favorable recommendation. Gov. Vance assured me he would report it at the earliest opportunity, and endeavor to pass it through the House before the adjournment of this session.

The bill is not in just the shape that we desire, but I am anxious to get it through the House, even in its present shape, this session, and then we could have a chance of perfecting it in the committee of the Senate at the next session.

In closing this report we tender our grateful acknowledgments to our colleagues on the committee, who were prevented from going to Washington, but who rendered valuable assistance by correspondence. We have also to acknowledge valuable assistance from the president and secretary of the Association, and from various members of the Association, who pressed the importance of the measure on the committee by letter.

Respectfully submitted,

ISAAC A. SHEPPARD.

The following is the circular letter to the Chairman of the Committee on Patents, referred to in the above report:

To the Honorable Robert B. Vance, Chairman, and members of the Committee on Patents of the House of Representatives: The undersigned, on behalf of the manufacturers of stoves in the United States, would respectfully ask your favorable consideration of bill H. R., No. 2022, entitled "A bill for the better security of property in patterns for metal castings," and desire to submit some of the reasons that have impelled them to ask for this legislation. In so doing it will be necessary to review briefly the past history of this branch of industry.

The manufacture of stoves for many years made but little advancement, owing to the fact that when a new stove pattern was made, and castings made from it, parties would take the article thus produced to cast from, and would make a business of duplicating from it. Hence for a long time such new patterns as were made were of the cheapest and most indifferent kind.

By degrees, however, in proportion as the patent laws and the laws providing for the registration of trade-marks afforded protection and encouragement, improvements became more rapid, to the great benefit of the community, a conspicuous illustration of the fact that it is wise and sound policy for a government to protect and to encourage those who give their time, their money and their brain to the production of such improvements as are for the general good.

The production of a new and improved stove involves no small amount of thought and study. It requires talent to invent, knowledge to construct and taste to adorn it. It must be fashioned into a form that will combine with utility the greatest possible attractiveness; for the advancement of our people in culture and in refinement of taste, daily demands a more careful, thoughtful and artistic ornamentation, the embellishments of a stove of the present day being often of the most elaborate kind. In the construction of every part of a modern stove watchful care is required. Each plate must be of suitable form and thickness, and so formed and fitted with entire freedom from mechanical defects as to stand the test of fire in practical use. The bearings and joints must be so fashioned as to endure the expansion and contraction incident to their use. Combined with all these, beauty of form and ornamentation are also required. To test the stove thoroughly demands weeks and months of trial by fire. Such are the essentials of a modern stove.

To produce such an article requires a large outlay of money as well as expenditure of time and thought. Having produced it one would naturally suppose that the manufacturer would reap the reward of this investment of his capital and of his skill. Such, however, is not the case. Unprincipled persons shamefully seize upon his property, and no statute law exists that will adequately protect him, and to seek protection on the principles of common law in State courts is both tedious and oppressively expensive. To illustrate: An enterprising manufacturer has determined upon producing an improved cooking stove, of which, in order to meet the wants of various families, he must make four sizes. The first step in the process is the making the necessary drawings from which to make original wood patterns. He employs experienced pattern makers to construct the wood patterns and a skillful carver to ornament them. The cost of this work will be from \$2000 to \$3000. Some feature of the above is patentable under the law, and for that particular part or parts (a grate and some particular plate if you please) he takes out a patent. The design is tasteful and the combination of its ornamentation is new, and for that he takes out a design patent. He gives it a name ("Cook's Favorite," for example), and he registers a trade mark for that.

After all this painstaking and expense most persons would conclude that he had some property in his patterns, the value of which would depend upon the merit of the article produced; and if all men were honest such would be the case. But unfortunately all men are not honest. Counterfeiters, thieves and pickpockets infest civilized communities, and prey upon them; and unprincipled men in like manner stand ready to avail themselves of what has cost the honest manufacturer time, thought and money, without giving an equivalent for it, and it is this fact that compels the stove manufacturers to ask for the passage of this bill as a measure of protection to them in their rightful property. We hold as a principle that security in property is the foundation on

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No. 27 North Fifth St.,

PHILADELPHIA, U. S. A.

which the fabric of civilization is built. To
return to our illustration: Our honest man-
ufacturer has produced a new and improved
cooking stove, and has registered as a trade-
mark its name, "Cook's Favorite." He has
patented the design, it being a novel combi-
nation of ornaments. He has made an im-
proved grate and some other improved plates
for it, on which he has been granted letters
patent. He has also made an improved
center piece, ingeniously constructed, the
better to withstand the strain on that part
of the stove on which he has received separate
letters patent. The other parts of the
stove, however, are not allowed to be patent-
able; for although entirely new and pro-
duced by great labor and expense, they do
not differ in form and general appearance
from similar parts of stoves previously
made sufficiently to enable him to obtain a
patent for them under existing laws. This
stove is put upon the market. It is regarded
with favor by the trade; it is sold and put
into use; it meets all requirements, and it
becomes known as a superior article. As
such it may be expected to come into favor,
and the manufacturer whose brain, capital
and enterprise have brought this new ar-
ticle of merchandise into existence has a
prospect of receiving a suitable recompense
for his outlay. But the manufacturer who
lacks the ability or the disposition to venture
upon anything new sees the stove which
has been thus produced. He covets it, and
like the counterfeiter, the pickpocket or the
pirate, he sets his wits to work to see how he
can get possession of this property without
giving any equivalent for it or having the
law take hold upon him.

Observe carefully his method of procedure.
He purchases, either in person or by proxy,
from the dealer who has the stoves for sale,
one of each size, ostensibly for private use.
He has them brought to his foundry and
taken apart. He cannot make the stove as a
whole, because of the patents and trade
mark; he therefore takes the various parts
and files up the castings. He takes off the
name "Cook's Favorite" and puts on
"Kitchen Companion," or some other name;
thus he avoids the trade mark. He makes a
grate that will fit the fire-box of the stove,
but differing from the patented grate, and
thus avoids the patent upon the grate. He
makes a plain center piece and puts it on,
and thus avoids that patent. He files off
some of the small ornaments, and either
leaves bare spaces or substitutes other or-
naments for them, just sufficient to change or
to destroy the design, and thus he avoids the
design patent. The remaining plates of the
stoves he uses as patterns without altera-
tion. The "pirate" thus secures, at an ex-
pense of a few dollars, a set of patterns, to
produce which has cost the enterprising
originator of the stove from \$2000 to \$3000
in money besides the time and study given
it. He proceeds to cast stoves from the pat-
terns thus obtained, and puts them upon the
market in competition with the wares of the
honest manufacturer whose expenditure has
originated them and whose capital is invested
in them, and of course at a lower price; for
it is generally true that stolen goods are sold
for less money than goods honestly produced.

The case stated is not an imaginary one,
but it is taken as one out of many in our
business experience, and we doubt not but
that each of the principal and more enter-
prising manufacturers of the country can
furnish many like instances. The same kind
of piracy is committed to some extent in
other branches of the manufacture of metal
castings by parties who, as we have stated,
take the castings of others and file them up
for patterns, and after casting therefrom
make merchandise of their product, but we
know of no other branch of honest in-
dustry that has suffered so much from this spe-
cies of robbery as the manufacture of stoves.

When a man designs an article and makes,
or pays for having made, a wooden pattern
from which castings can be made, has he not
a property right in that pattern? We think
he in justice has, and we think that others
should not be allowed to use it without com-
pensation. He originates and produces at a
heavy cost the original pattern. He makes
castings from it and sells them for use as
manufactured articles. His pattern repre-
sents his investment of capital. We ask
what possible right has another to take the
product of his brain and money, put into
property in that shape, to make other cast-
ings from it, and to put the castings so made
into competition with the wares of the party
whose property has thus been stolen?

We appeal to you, in the interest of com-
mon honesty and fair dealing, to pass the
bill in question, and thus prevent the unprin-
ciple from appropriating the unrequited
labor of the honest man to their own use
without compensation. We fail to see that
any valid objection can be made by an hon-
est man to the provisions of this bill. It
abridges no man's rights. It only restrains
the wrong-doer.

We do not seek to prevent a man from
making as many wooden patterns as he may
please for articles or plates not patented,
and we think the proviso appended to the bill
fully protects the public or the consumer
from any hardship. The proviso allows the
farmer, the mechanic, or any citizen to take
a casting and to produce a duplicate there-
from, or to procure the same to be produced
for his own personal use. To this we make
no objection.

We but desire a law to protect our hon-
estly acquired property in patterns, and to
restrain dishonest manufacturers from ap-
propriating it to make merchandise thereof
to the damage of the rightful owners of the
property. We think that the law ought to
throw about this kind of property such
measure of protection as shall empower a
court of justice to apply a right and fitting
remedy upon hearing and determining the
cause of complaint of parties injured.

Indulging the hope of your favorable and
speedy action on the bill, the above is re-
spectfully submitted.

ISAAC A. SHEPPARD,
Chairman of Committee of the Stove
Manufacturers' Association of the United
States.
February 28, 1878.

On request, Mr. Sheppard read the House
Bill as now constituted, and in reply to a
question from Mr. T. F. Filley, stated that
the fee of \$20 referred to in the bill would
probably apply to each part of the pattern
of a casting. This would be amended, how-

ever, before the final passage of the bill.
It had been thought best to let the bill pass
the House in its present form, and as there
would probably be amendments made in the
Senate, the matter of the fee could then be
corrected. A fee of \$20 would, undoubt-
edly cover the patterns for an entire stove.
The following is the bill:

Mr. Vance, from the Committee on Patents,
reported the following bill as a substitute for
H. R. 2022:

**A Bill for the Security of Property in
Metal Castings.**

Be it enacted by the Senate and House of
Representatives of the United States of
America in Congress assembled, That any
person or firm domiciled in the United
States, and any corporation created by the
authority of the United States, or of any
State or Territory thereof, who, by their
own efforts or expense, have produced any
original pattern for metal castings, and who
desire to obtain for the manufacture of
metal castings the exclusive use of such,
may obtain protection therefor by complying
with the following requirements:

First, by placing upon such patterns and
castings the word "registered," together
with the date of such registration.

Second, by causing to be recorded in the
Patent Office a statement specifying the
names of the parties desiring the protection,
their residence and place of business, to-
gether with a general description of the
pattern to be registered, and duplicate pho-
tographs or drawings of such patterns.

Third, by making payment of the fee of
\$20, in the same manner and for the same
purpose as the fee required for patents.

Fourth, by complying with such regula-
tions as may be prescribed by the Commis-
sioner of Patents.

Section 2. The statement prescribed by the
preceding section, in order to create any
right whatever in favor of the party filing
it, must be accompanied by a written de-
claration, verified by the person by whom,
or by some member of the firm or officer of
the corporation by which, it is filed, to the
effect that the party claiming protection for
the pattern is the rightful owner thereof,
and that the description and drawings truly
represent the pattern.

Section 3. Copies of the certificate, and of
the date of the receipt thereof, and of the
statement and drawing filed therewith, under
seal of the Patent Office, duly certified, shall
be evidence in any suit in which such regis-
tered patterns shall be brought in contro-
versy.

Section 4. A certificate of registration as
above prescribed shall remain in force for
seventeen years from the date of such regis-
tration. Such certificate, during the period
that it remains in force, shall entitle the
person, firm, or corporation registering the
pattern to the exclusive use thereof, to this
extent, that no other person shall lawfully
use castings made from said patterns as
patterns for the production of other castings.

Section 5. Any person who shall counter-
feit or make a *fac simile* of any metal cast-
ings so registered, or use such metal casting,
either in whole or in part, as a pattern in
molding, unless by the written consent of
the owner of the original pattern from which
the casting was made, shall be liable to an
action on the case for damages for such
wrongful use of such castings, at the suit
of the owner of the pattern thereof, and the
party aggrieved shall also have his remedy,
according to the courts of equity, to enjoin
the wrongful use of the casting made from
his pattern, and to recover compensation
therefor in any court having jurisdiction
over the person guilty of such wrongful use:
Provided, That this act shall not be con-
strued to prevent the production of any
article specially ordered or intended for
the personal use of the party ordering
or producing the same, and not intended or
exposed for sale as merchandise.

Section 6. The Commissioner of Patents is
authorized to make rules and regulations
and prescribe forms for the transfer of the
right to the use of registered patterns, con-
forming as nearly as practicable to the re-
quirements of law respecting the transfer
and transmission of copyrights.

The report was accepted with thanks to
Mr. Sheppard for his exertions in behalf of
the Association before the Congressional
committees, and the committee continued.
(To be continued.)

Economy in Ironmaking.—The question
of utilizing dry oxide cinder in lieu of sand
for mill-furnace bottoms was discussed at
the South Staffordshire Mill and Forge Man-
agers' Association on May 11. Mr. T. Tibbs,
in a short paper, explained that the want of
success of the systems hitherto adopted for
the securing of dry oxide cinder bottoms
arose from the non-protection of the mill-
furnace flue hole from cold air; and that he
had patented a simple method for its pro-
tection by which the lap cinder was kept
pure and dense, and became the best fet-
tling that could possibly be had for the pud-
dling furnace. By the use of a cinder over
the sand bottom a greater quantity of iron
could be charged on to it, a "slope" being
unnecessary; the whole of the pile instead
of the top side only was heated; scraps
were no longer necessary, as the cinder ob-
tained from the mill was used instead; fet-
tling with this cinder allowed six heats of
puddled iron to be produced in less time than
with the ordinary fettling; the yield was in-
creased 1 cwt. per ton, and the quality of
the iron was improved. The metal worked
better alike under the hammer and at the
rolls; all finished bars of wide sizes, plates,
angles, &c., were turned out not only free
from sand, cracks, blotches and inferior
edges, but bluer and more "eyeable." Dur-
ing the discussion which ensued Mr. Tibbs
stated that with his dry cinder bottom he
saved one-half cwt. per ton in the waste. He
had now abolished sand from the mills of
the Great Bridge Iron and Steel Company,
Tipton, and used instead finely-powdered
pottery mine. The scale from the rolls that
men used to be paid to wheel away as waste
could now be utilized. A good protection
was secured in this fettling for the bottom
plates. The president (Mr. Healey) pointed
out that the outcome of the meeting must be
the saving of money in the manufacture of
finished iron and steel. Members intimated
their intention to adopt the system at the
mills and forges they managed.

The New Oil Region in McKean County, Pa.

A correspondent of the Philadelphia *Ledger*, writing from Bradford, Pa., says: Bradford is nearly the center of the new oil region, which is about 23 miles long and 13 miles wide, principally in McKean county. A portion of it, however, is in Cattaraugus county, New York, and from this point it extends east by southwest, through a broken country of ravines and hills, ranging from 500 to 800 feet high.

The first discovery of oil was made by a Mr. Moses, just over the Pennsylvania line, at a place called Limestone, now a growing town, and in approaching Bradford from Buffalo the first derricks are seen at this point. The wells in this new territory number at the present time about 1800, and new ones are being opened every day—in fact, so rapidly are they opened that the producers are becoming alarmed for fear that the supply will so far exceed the demand (which is the case now, in a measure) that to own an oil well will mean loss of money, if not bankruptcy.

These wells range from 1200 to 4500 feet in depth, and are generally known as pumping wells, and yield, on an average, from 6 to 10 barrels daily, though some of them produce 50 or more barrels. The aggregate yield for the entire district is from 15,000 to 16,000 barrels per day, and the sales were made recently at \$1.10 per barrel. The territory is so abundant in oil that but few dry wells have yet been found to dishearten the borer; and so easily are the flowing or pumping wells operated, that one man attends to a half dozen of them, so thick are they in some places. The oil is shipped in iron tank cars, the oil from the tanks at the various wells being conveyed through a network of pipes to large receiving tanks on the line of the railroads. These tanks, which hold from 10,000 to 25,000 barrels, are at Olean, Carrollton and Salamanca. The one at Olean is connected with the Buffalo, New York and Philadelphia road; at Carrollton with the Erie, and at Salamanca with the New York Central. The oil flows into these tanks from the numerous wells, and by force pumps at these stations into the tank cars. It is said that this section is susceptible of much greater increase in production, but those having wells here, as well as in the old oil region, are making efforts to prevent the opening of new wells, and keeping down the production, even from the present wells, until prices advance. The opinion seems to prevail very generally that unless this is done many persons, and particularly those who have operated on borrowed capital, will be in the hands of the sheriff. The production in the entire oil region is estimated at about 40,000 barrels daily, while the sale or demand does not exceed 25,000 barrels. Two years ago oil sold here at about \$3.50 per barrel, and it has gradually declined to the present price, and is likely to be still lower. In fact to-day the parties controlling the central tanks refused to receive or buy any more at present, and all sales have been stopped at individual wells.

The best view to be had of the oil development in the section after leaving Bradford is to pass over the Olean, Bradford and Warren Narrow Gauge Railroad, recently opened to travel, to Olean. Passing up the Tuna Valley and Foster's Brook hundreds of derricks are in sight and towns are springing up like magic all along the line of the road. The first place reached after leaving Bradford is "Tarpot." Here there are large tanks and powerful pumps for forcing the oil to the receiving stations through pipes which lie on the surface and can be seen all through the section.

Above this place are Derrick City, Gilmore and Red Rock, all within two miles, and each rapidly spreading; and though these towns were only commenced late last year they now contain quite a large population. In fact at Red Rock many of the buildings are rather better than is usually found in a new country like this, most of it being wild and rugged in the extreme. The narrow gauge passes these towns on one side of the mountain until Red Rock is reached, when it makes a short curve and climbs the opposite side with a grade of 175 feet to the mile, and opening up a fine view of the valley almost to Bradford. It then follows four-mile and two-mile run, cropping into New York State, 10 miles from Bradford and 13 miles from Olean, on the Allegheny River. The oil wells are to be found along the side of the two runs mentioned, but soon after passing the State line the wells are not yet to be found.

How to Study Science.—Prof. F. W. Clarke has an article in the *Popular Science Monthly* for June, in which allusion is made to the true method of studying science: Every student of science should meet Nature at first hand, and learn to observe her phenomena for himself. Lectures and text books are but minor accessories to study; in science they play a wholly subordinate part; in the laboratory, the field and the museum, the chief work is to be done. No matter what branch of science is to be pursued, the student from the very first must meet it face to face. The biological sciences ought to be studied in the field, collecting, in the museum, classifying; in the laboratory, with the microscope and the scalpel. Far too often is the study of natural history degraded into a mere memorizing of classifications; as if the transitory part of the science were more valuable than the permanent! The student must see, handle and investigate for himself. He is to study the phenomena of life, and not merely the external appearance of a lot of stuffed specimens. Chemistry, and physics also, is to be studied chiefly in the laboratory. It is not enough for a student to see experiments, he must perform them. Thus only can he learn the true scope of these great sciences. By a proper drill in qualitative analysis he learns to observe closely, and to reason from his facts to their interpretation. Quantitative analysis gives him accuracy of manipulation, and an insight into the absolute value of experiment. This insight also results from delicate practice with instruments of precision in physics; a kind of exercise of the

very highest educational value. If the course of study in any science can be capped by an original research leading to the discovery of new facts, so much the better. In a German university the candidate for a doctor's degree in science is absolutely required to carry out such a research, and to submit a dissertation upon it. This is not a severe requirement—every student who has been decently trained is able to come up to it, all the popular notions about the mysteriousness of scientific research to the contrary notwithstanding. Why should we not aim to equal the German standard?

The law of checks was plainly defined by Judge Thayer, of Philadelphia, in a recent charge to a jury. He held that before the indorser of a check could be held for it, it must be shown that the receiver had presented it to the bank on the day of its reception, before the close of banking hours on the following day, when, if dishonored, notice must be given thereof to the indorser, which makes him liable for the same. But if the holder of a check thus given neglects to present it for payment until after the second day of its acceptance, and it is then dishonored, the indorser is not liable for it, and the loss, if any, falls on the holder.

Special Notices.

SPECIAL NOTICE.

The undersigned offer their services as agents to American Producers of Metals. They represent foreign brands of Zinc, Rusta Iron, Hoop Iron, Window Glass, Cutlery and Guns.

LOUIS WINDMULLER & ROELKER,
90 Reade Street, N. Y.

FOR SALE.

Iron and Heavy Hardware House, MILWAUKEE, WIS.

Owing to the removal to the Works of our resident partner, Mr. T. M. Jones, we will sell the stock, good will and fixtures of the Iron and Heavy Hardware Business now conducted at Milwaukee, Wis., as a branch of the American Iron Works, Pittsburgh. The business is well established, and the stock of iron, nails and heavy hardware is of the best quality, having been manufactured at our works and selected with the greatest care for the trade. This affords an excellent opportunity for any parties desiring to engage in a thoroughly organized and prosperous business in a favorable locality.

Our Branch House will be continued as heretofore at No. 190 to 196 South Canal Street, Chicago. Applications may be made to us at Pittsburgh, Chicago or Milwaukee.

JONES & LAUGHLINS.

Second-Hand Machinery.

One 14 in. x 30 in. Whitehill & Smith Adj. Cut-off Engine, Wheel 10 ft. diam., and
One 14 in. x 15 ft. Tab'r Boiler for same; both almost new.
One 10 in. x 24 in. Fishkill Landing Engine, and
One 10 in. x 24 in. Tab'r Boiler for same; both almost new.
One 10 in. x 24 in. Harris Corliss Engine, with Boiler, Pump and Heater, never run, price very low.
One 20 in. x 12 ft. Engine Lathe, Rod and Cross Feed.
One 22 in. x 10 ft. Engine Lathe, Pond; all improvements.
Two 15 in. Pratt & Whitney Engine Lathes, with Taper Attachment. One Lincoln Gear Cutter, nearly new. Two Lincoln Milling Machines. Four Brainerd Milling Machines. One each 1, 2, 3 and 4 spindle Drills. Pratt & Whitney No. 6 Rod Blower. One 80 lb. Merrill Drop Hammer, good as new. 70 feet 2 in. Double belt. 38 ft. 10 in. Double Belt.

E. P. BULLARD, 14 Dey St., New York.

HARDWARE BUSINESS FOR SALE.

Rare chance to purchase stock of a well-established business in central Illinois. Stock will invoice about \$6,000. The best of reasons given for selling. Address "HARDWARE,"
Office of *The Iron Age*, 83 Reade St., N. Y.

DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

Iron and Steel Drop Forgings in quantities to order at reasonable rates.

HERMANN BOKER & CO., Proprietors,
101 & 103 Duane St., N. Y.

A YOUNG MAN HAVING FIVE YEARS' experience in wholesale Hardware, wishes a situation as traveling Salesman. Good reference. Address
Office of *The Iron Age*, 83 Reade St., New York.

A WELL-KNOWN IMPORTING HOUSE (ESTABLISHED IN 1854) desires a partner, special or general, with \$25,000 to \$50,000. Please to address
Office of *The Iron Age*, 83 Reade St., N. Y.

Will the maker of the machines which produce the American Hob or Shoe Nails communicate with
I. & E. ISON,
Ashby de la Zouch, England,

and with prices and particulars of the machines; also send mail samples of the nails made.

WANTED by an experienced man a position as stock clerk, buyer or traveler for whole sale house or manufactory. Address, A. C.,
Office of *The Iron Age*, 83 Reade St., N. Y.

SPECIAL NOTICE.

The undersigned, in view of the Paris Exhibition of 1878, begs to inform his friends that he continues to make translations of Catalogues, Prices-current, Circulars, Correspondence, &c., from and into the

ENGLISH, FRENCH, GERMAN and SPANISH, and that he bestows special attention upon a strictly correct rendering of *Technical Expressions* in matters relating to *Machinery, Metallurgy, Hydraulics, &c.* The very best reference will be furnished from leading manufacturers in this city, Philadelphia and elsewhere, for whom he has translated. If desired, estimates will be procured for the setting up, electrotyping and printing of catalogues, &c., in the above languages.
C. KILBROCK,
Metal Reporter of *The Iron Age*,
83 Reade St., New York.

Special Notices.

JENNINGS'S COMBINATION DISCOUNT TABLES.

(Published by the author.)

This Book contains 1500 tables for single and combination discounts, such as 17½%, 45%, 1087½%, 15%, 25%, 33½%, 50%, 58¾%, 62½%, 75%, 80%, 85%, 90%, 95%, 100%, 105%, 110%, 115%, 120%, 125%, 130%, 135%, 140%, 145%, 150%, 155%, 160%, 165%, 170%, 175%, 180%, 185%, 190%, 195%, 200%, &c., which are so arranged as to be found without loss of time, and by their use either the Discount or Net on any amount of dollars and cents, from a penny to one million dollars, can be ascertained in a few seconds entirely by Addition. Just the thing for making or proving invoices, finding Net Value of goods bought or sold, and comparing different Discounts, thereby saving time, blunders and headwork.

(A copy can be examined in "The Iron Age" Exhibit at the Paris Exposition.)

NEW ALBANY, IND., April 25, 1878.
Mr. S. H. Jennings:—Please let me know if we can procure "Jennings's Combination Discount Tables" in any city near here. We wish to examine it previous to purchasing. If you would like to send H. C. O. D., you paying charges, with privilege of examination before taking, you may send one.
Yours truly,
TERSTEGGE, GOHMAN & CO.,
National Stove Works.

NEW ALBANY, IND., April 30, 1878.
Mr. S. H. Jennings:—Your Book received by mail. We like the Tables very much. Enclosed find three dollars. Please acknowledge receipt.
Yours truly,
TERSTEGGE, GOHMAN & CO.,
National Stove Works.

NICHOLS, TIGGA CO., N. Y., May 5, 1878.
I am very much interested in your Tables. They are a great saving of time and labor, and I take pleasure in recommending them to others.
ALEXANDER A. SWINTON.

We use the Tables in making out invoices and find them accurate and useful. We would recommend them to parties who have many discounts to make and who wish to find the same quickly.
ROCKFORD BOLT WORKS.

It will be mailed, postpaid, to any address, on receipt of the price, \$5. Currency may be sent by mail at my risk. Address
S. H. JENNINGS,
Deep River, Conn.

S. H. JENNINGS, Deep River, Conn., U. S. A.,

Offers his services to parties in any FOREIGN COUNTRY, except Great Britain, who may desire to establish, build up, or increase a trade in American Hardware, Agricultural Implements, Machinery, and Miscellaneous Goods, as EXPORT FACTOR, at a low rate of commission. Correspondence solicited. He has had three years' experience as Purchasing Agent for

Messrs. W. M. MARPLES & SONS, Sheffield and London, England, Jobbers doing business throughout Great Britain, and to whom he would with pleasure refer. By arrangement with them he will represent no other firm having a house or branch house in Great Britain, which includes England, Ireland, Scotland and Wales. He buys direct from manufacturers, and only for export, thus securing lowest possible prices. He will attend to all matters this side of the water, including Purchases, Shipments, Remittances, &c., and has facilities in New York City for securing prompt shipments at most favorable rates of freight. Manufacturers of goods desiring for Foreign Trade are invited to send in their circulars or catalogues, and quote "hard pan" prices for export, which will be considered confidential.

PRICE BOOKS

FOR General Hardware.

Half Leather, \$10.00. Full Leather, \$15.00.

POCKET EDITION

Just Out.

Fine Leather Binding, \$5.00. Send for circular.

Buell Lamberson,

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Wanted,

TO PURCHASE OR LEASE,

A Rolling Mill in complete working order. Please state terms, location, product made and full particulars as to number of puddling and heating furnaces, tools, &c.

E. L. MOITE,
60 Congress St., Boston, Mass.

For Sale.

Large Punch and Shears, 12,000 lbs., will punch 4 in. plate; two sets of Punches and Shears; 12½ ft. Planer; Lathes, Drills and Machinists' Tools of all sizes; a large lot of Architectural Ironwork Tools; Wood-working Machinery; Tanks of all sizes; Hydraulic Presses; Steam Engines and Boilers of all sizes; from 5 to 500 horse power, and Pumps of all sizes and makes at less than cost and as good as new.

JOHN CARROLL,
266, 268 and 270 Front, near Roosevelt St., New York.

SITUATION WANTED—AS BOOKKEEPER OR Traveling Salesman. Have had nine years' experience in the above positions in the Hardware Business. A1 references furnished. Am not afraid to work and willing to make myself useful. No objection to going to any place offering a permanent situation.

Address W. B. G.,
Office of *The Iron Age*, 220 South 4th St., Phila., Pa.

Eighty Bushels of Charcoal,

With a net profit of \$7 per cord of wood, can be obtained by using the new apparatus patented in the United States, France, &c. The savings effected by this process amount to enough in one year's time to pay for all necessary material required to carry on the operation. The patentee has had 17 years' experience and can give good references.

CHARCOAL WOODLAND,
Office of *The Iron Age*, 220 S. 4th St., Philadelphia.

For Sale,

PATENTS FOR RANGE BOILERS.

For Sale.—All the patents and reissue for wire bound copper Range Boilers, galvanized Range Boilers (no brazing or calking required on Boilers), Soda Bountain, Milk Can, Ash Can, &c., &c. For full particulars address

P. LESSON,
No. 22 Montrose Ave., Brooklyn, E. D., N. Y.

Wanted,

on July 1st, by a foreign Hardware and Cutlery House, a travel agent in South and Southwest on commission. Address, with references,

Special Notices.

W. GARNER,

General Merchant,

Mouldsworth, near Chester, England,

Supplies nearly every class of Goods,

including all kinds of

Agricultural Machinery, Domestic Machines,

SEWING MACHINES

And Artificial Manures.

W. GARNER is open to represent any Foreign Manufacturers in England for the sale of their manufactures of whatever nature or kind. Having a wide and well established connection in the Provinces, could introduce some American, German and French products to mutual advantage.

W. GARNER is also open to buy any kind of Goods on commission, and ship them to any part of the world. Manufacturers or others desiring his assistance will please address (with full particulars in English) as above.

To Manufacturers and Jobbers of Hardware, Cutlery, &c.

Manufacturers and Jobbers, having surplus stocks or goods that from any cause are unsaleable upon which they wish to realize, or assignees who have stocks to dispose of, will find a cash purchaser by communicating with

W. M. CALDWELL,
Dealer in
Job and Auction Lots of Hardware, Cutlery, &c.,
102 Chambers St., New York.

AUSTRALIA.

AMERICAN HARDWARE CO.,
No. 9 WILLIAM STREET, MELBOURNE, AUSTRALIA.

Solicit correspondence with American manufacturers desiring representation in the Australian Colonies. Consignments will have prompt attention. References furnished.

For Sale, To Let or Exchange

For other Property (Western preferred), Stock or Interest in an established Business,

On very reasonable terms, one of the finest pieces of property in the country for Foundry or general Manufacturing purposes, and consists of the following substantial brick buildings, situated corner Vail Ave. and North St., Troy, N. Y., viz., Moulding room, 12x24 ft., with large three-story building attached, 17x23 ft. The distance between floors and ceilings on each story is respectively 14, 12 and 10 ft., and are now used as mounting, store, sample and office rooms. Attached also is a two-story building, 50x45 ft., with engine and boiler rooms. On same grounds are sheds, barns and large yard. Attached to the property also are engine and boiler, main lines of shafting, elevators, &c. The property fronts on three streets. It will be sold, rented or exchanged, in part or together, and at very low price. Address

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Columbus, O.

Or W. H. HOLLISTER, JR., Troy, N. Y.

WANTED.—A SITUATION AS TRAVELING

Salesman in the Iron, Steel or Metal trade. Have an extensive acquaintance with manufacturers, machinists, &c., throughout the United States. Can give first-class references, having had nine years' experience as salesman. Salary expected moderate. Address
A. F. W.,
281 Erie St., Cleveland, O.

HALSEY & MILLET,

Auctioneers and Commission Merchants

112 Chambers St., New York.

Solicit from manufacturers, importers and jobbers consignments of Hardware, Cutlery, House Furnishing Goods, &c., &c., for their regular weekly sales.

JAMES E. HALSEY, CHAS. A. MILLET,
formerly of
J. E. Halsey & Co. Blaisell, Welles & Millet.

The Sherman Process Co.

9 Pemberton Square, Boston, Mass.,

Issue Licenses to use the Process for the Manufacture of Iron and Steel

In the Bessemer Converter, Crucible, Siemens-Martin, Puddling, Blast and Cupola Furnaces.

The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working. See page 17 of *The Iron Age* of Oct. 25th, 1877.

Bissell & Welles,

Wholesale Hardware Auctioneers,

No. 15 Murray St., New York.

Sales held weekly for the trade. Consignments solicited. We refer to the leading Manufacturers and Importers.

For Sale,

A well-selected stock of Hardware, in one of the most thriving county seats in Ohio. Stock all first-class, and in splendid order. Stock not large, but very complete. This is a rare opportunity. Terms easy. For particulars, &c., address

A. B.,
No. 43 Superior St., CLEVELAND, OHIO.

Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy.

A practical man with means is wanted to join a practical man who is already well established.

Address CAR WHEEL FOUNDRY,
P. O. Box 134, Selma, Alabama.

WANTED.

Controlling Agencies for saleable articles of Hardware manufacture, suitable for home consumption or export.

ROD & CHASE,
Manufacturers of Oil Stones, 107th St., N. Y.

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address,
IRON AND STEEL,
Care of P. O. Box 813, Bridgeport, Conn.

NOW READY.

THE Metallurgical Review

For July.

PUBLISHED MONTHLY BY

DAVID WILLIAMS,

No. 83 READE ST., NEW YORK.

Branch Offices,

220 South Fourth St., Philadelphia.

77 Fourth Ave., Pittsburgh, Pa.

Subscription, including Postage to any address, domestic or foreign,

\$5.00 - - - A YEAR.

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The above summary of the contents of the July number of *The Metallurgical Review* shows that its contributions are varied in character and of immediate practical importance.

Phosphorus determinations, the value of which is being daily more universally recognized, are by no means uniformly excellent or reliable, so that faith in their results becomes complete only when they are indorsed by the name of some prominent chemist. The reason for this uncertainty and lack of confidence is, to a certain extent, due to the circumstance that the methods employed are very numerous and demand high skill and conscientious work. The fact that these methods are by no means perfect has induced a large number of chemists to make individual researches, the fruits of a series of which are presented to the metallurgical professions by Messrs. Alfred E. Hunt, S. B., and Samuel Peters, whose work and the results to which it has led deserve careful investigation.

The third installment of Alex. L. Holley's valuable paper on the "Terrenoire Process of Making Steel" lucidly and simply states the chemical theory of the process, and gives some valuable practical data about molds, annealing and the uses of solid steel castings. The subject of the paper has attracted a large share of the attention of metallurgists recently, and it bids fair to be one of the revolutionary progressive movements marking the beginning of a new departure in the application of steel to many engineering purposes.

Professor T. Eggleston, in the third and last installment of his paper on "Copper Dressing in Lake Superior," continues his accurate description of the construction, the work and the capacity of the dressing apparatus used in that region, which are in many respects unique.

Professor Anton Von Kerpely's description of the occurrence of liquid cyanides in a Hungarian blast furnace was translated for *The Metallurgical Review* from a manuscript copy of the proceedings of the Academy of Sciences, before which it was read. Although cyanides have been observed, even in large quantities, repeatedly, their nature has never been so carefully examined, nor were the conditions connected with their appearance so minutely noted as in this case. These are facts which give the paper great importance, as it is only by a thorough research of all phenomena connected with the blast furnace that its working can be clearly understood and corrective

Trade Report.

Office of The Iron Age,
Wednesday Evening, June 26, 1878.

The past week has been comparatively uneventful in financial circles. The money market is easy, with rates at 2 1/2 % on call. The rate of discount on prime business paper is 3 @ 4 %.

The gold market has been without fluctuations of sufficient importance to tabulate. The average quotations of gold is 100 1/2. Silver in London is worth 52 1/4 d., which gives the 412 1/2 grain silver dollar a bullion value here of \$0.8894 in gold.

The bond market is active for governments, which is due to the present ease of the money market and to the fact that after the July interest disbursements it will probably become still easier. There is a fair demand for other investment securities, including desirable railroad mortgages. We give below the closing quotations of governments.

The stock market has been irregular, but generally active, with principal dealings in Lake Shore, Western Union, D. L. & W., St. Paul, Pacific Mail and Northwestern. We give below the closing quotations of active shares.

The changes in the bank averages during the week were as follows:

Loans.....	Inc.	\$74,600
Specie.....	Dec.	2,035,500
Legal tenders.....	Inc.	2,974,600
Deposits.....	Dec.	401,100
Circulation.....	Dec.	705,000

These changes increase the surplus reserve \$1,028,725.

The foreign trade movements for the week are shown in the following tables:

For week ended June 22:

Total for week.....	\$4,402,551	\$6,184,238	\$5,892,128
Prev. reported.....	149,006,395	150,783,389	133,477,460

Since Jan. 1.....\$13,498,947 \$16,964,647 \$139,359,588

Included in the imports of general merchandise were articles valued as follows:

	Quantity.	Value.
Anvils.....	125	\$2,100
Brass goods.....	3	166
Bronzes.....	6	764
Copper.....	302	302
Cutlery.....	48	15,080
Guns.....	9	9,100
Hardware.....	5	501
Iron, pig, tons.....	200	2,876
Iron, sheet, tons.....	15	1,146
Iron ore, tons.....	15	10,030
Metal goods.....	35,472	8,720
Nails.....	7	1,065
Needles.....	11	2,094
Old metal.....	201	201
Platina.....	1	95
Plated ware.....	1	103
Per. caps.....	5	1,479
Saddlery.....	10	11,990
Same time in 1877.....	1,145	26,981,214
Same time in 1876.....	383	69,401
Tin, slabs.....	62	621
Wire.....	13	116

EXPORTS, EXCLUSIVE OF SPECIE.

For week ended June 25:

For the week.....	\$6,074,504	\$5,711,029	\$5,851,280
Prev. reported.....	115,121,113	123,795,264	128,436,026

Since Jan. 1.....\$12,795,617 \$12,505,293 \$161,280,546

For week ended June 22:

Total for the week.....	\$10,025	\$10,933
Previously reported.....	8,510,933	

Total since Jan. 1, 1878.....\$8,520,938

Same time in 1877.....18,455,322

Same time in 1876.....28,504,431

Same time in 1875.....20,706,700

Same time in 1874.....27,074,413

Same time in 1873.....33,436,883

Government bonds close as follows:

	Bid.	Asked.
U. S. Currency 6's.....	120 1/2	120 3/4
U. S. 6's 1881 registered.....	107 1/2	107 3/4
U. S. 6's 1881 coupon.....	110 1/2	110 3/4
U. S. 6's 1885 new reg.....	105 1/2	105 3/4
U. S. 6's 1885 cou.....	105 1/2	105 3/4
U. S. 6's 1887 reg.....	105 1/2	105 3/4
U. S. 6's 1887 cou.....	105 1/2	105 3/4
U. S. 6's 1888 reg.....	105 1/2	105 3/4
U. S. 6's 1888 cou.....	105 1/2	105 3/4
U. S. 10-40 reg.....	108 1/2	108 3/4
U. S. 10-40 coupon.....	108 1/2	108 3/4
U. S. 6's 1881 reg.....	106 1/2	106 3/4
U. S. 6's 1881 coupon.....	106 1/2	106 3/4
U. S. 4 1/2's 1891 registered.....	103 1/2	103 3/4
U. S. 4 1/2's 1891 coupon.....	103 1/2	103 3/4
U. S. 4's 1897 registered.....	100 1/2	100 3/4
U. S. 4's 1897 coupon.....	100 1/2	100 3/4

The following were the closing quotations of active shares:

Atlantic and Pacific Telegraph.....	26	27 1/2
Chicago and Northwest.....	47 1/2	47 3/4
Chicago, Rock Island and Pacific.....	72 1/2	72 3/4
Chicago, Bur. and Quincy.....	106 1/2	106 3/4
Col. Chicago and Ind. Central.....	3 1/2	4
Clev. Col. and Ind. Central.....	27	27 1/2
Cleveland and Pittsburgh.....	79	79 1/2
Chicago and Alton.....	78	78 1/2
Delaware, Lack. and Western.....	102	102 1/2
Delaware and Hudson Canal.....	58 1/2	58 3/4
Express-American.....	47 1/2	47 3/4
United States.....	47 1/2	47 3/4
Wells, Fargo & Co.....	93 1/2	93 3/4
Harlem.....	15 1/2	15 3/4
Hannibal and St. Joseph.....	11	11 1/2
Illinois Central.....	26	26 1/2
Kansas Pacific.....	83 1/2	83 3/4
Kansas and Texas.....	6	6 1/2
Lake Shore.....	58 1/2	58 3/4
Michigan Central.....	65 1/2	65 3/4
Morris and Essex.....	83	83 1/2
Milwaukee and St. Paul.....	51 1/2	51 3/4
New York Central.....	108 1/2	108 3/4
New Jersey Central.....	33 1/2	33 3/4
New Jersey Southern.....	14	14 1/2
Ohio and Mississippi.....	7 1/2	7 3/4
Pacific Mail.....	12 1/2	12 3/4
Panama.....	123	123 1/2
Pittsburgh and Fort Wayne.....	94	94 1/2
St. Louis Kansas City Northern.....	43	43 1/2
Toledo, Wahash and Western.....	12 1/2	12 3/4
Union Pacific.....	64 1/2	64 3/4
Western Union Telegraph.....	87 1/2	87 3/4

GENERAL HARDWARE.

The dullness incident to midsummer is the prevailing feature of the Hardware market, and there is absolutely nothing of an interesting nature to report.

The demand for Nails is light, and the tone of the market in the matter of prices continues in the same weak condition pre-

viously noticed. We quote rod, to 60d., \$2.30, net, which price could be shaded for a large order.

Fernald & Sise have been appointed agents for the Metal Stamping and Enameling Co., of St. Louis, Mo. They will carry a full line of their Stone Ironware in stock at their warehouse, No. 100 Chambers street.

The Penfield Block Works, Lockport, N. Y., are now prepared to furnish their style "F" Blocks for farmers' use in sizes 8, 9 and 10 inch, with either lignumvitæ or iron Sheaves, plain or all-steel Roller, bushed. H. B. Newhall, No. 11 Warren street, is their agent in this city.

Hamilton & Matthews, Rochester, N. Y., illustrate, in their advertisement on the 26th page, Fowler's Patent Improved Tumbler Fly Trap, which they claim is not only the cheapest, but the surest fly catcher in the market. It is a marvel of cheapness, being offered to the trade at 75 cents per dozen without tumblers; in lots of one gross this price is subject to discount 20 per cent.

Leonard Bailey & Co., Hartford, Conn., have placed on the market a new Circular Plane, which is illustrated and fully described in their advertisement on page 26.

We print below some communications which we have received on the subject of the proposed auction sale of Screws:

VERMONT, June 17, 1878.

To the Editor of The Iron Age—DEAR SIR: I noticed the communication in your issue of the 6th, in relation to sale at auction of Screws by the American Screw Company. I have read with care your editorial in same issue, also correspondence published on the 13th. Allow me to criticize for one moment.

In the correspondence you publish with your own opinion the dominant idea seems to be that somebody will lose some money. Who? Not the consumer, for he only buys as he wants. Not the country merchant, for his stock is so small that any further decline in value would possibly amount to nothing. Then it must be the jobber. Very good. We can all do without that class of Hardware men, so let them stand from under. Again, your correspondents think it impossible to increase the consumption of Screws. Such a proposition can only be compared to the ruinous policy of the trades unions of Great Britain in allowing only a limited number of young men to learn a particular trade for fear of causing a surplus of that special branch of labor. This fact, together with its ruinous results to the laborer, the manufacturer and the nation as a whole, is so well known that explanation is needless.

The proposition to take this surplus stock abroad and sell it in foreign markets looks still further to the protection of your correspondents, who seem to forget that such an experiment, while it would be very expensive to the parties attempting it, might prove to be a failure which would react to the injury of not only the article offered, but to kindred goods of American make. It is reasonable to suppose that the sale, if it occurs, will be duly advertised. In view of the fact that Americans have in the past and do at present go abroad to buy merchandise suited to the wants of our country, it is reasonable to suppose that representatives of other nations may come here to buy; and it seems to me that it would be much better for the American manufacturers if they could induce representatives of foreign trade to come here than for us to take goods abroad for sale. It cannot be a question but what it would reduce cost alike to purchaser and consumer. You may say we are too young as exporters to attempt that. It is a question admitting of much doubt. Again, if we always take our products abroad we must always so continue.

Can a corporation or company be found in the Union better fitted to invite representatives of foreign trade to come here and look for merchandise than the American Screw Company? Would not such a sale as they contemplate attract more hardware men from abroad than anything yet done? Finally, while the proposition of the American Screw Company to offer for sale at auction so large a quantity of Screws (as they undoubtedly will) is a novel idea, it is one eminently worthy to originate with such able men as manage the affairs of that corporation. And if the idea is carried out there can be but one result, and that beneficial alike to the manufacturers, the dealer and the consumer, not only in relation to this particular item, but to the manufacturers of all kinds of merchandise produced in this country suited to the wants of other nations.

GREEN MOUNTAIN BOY.

PHILADELPHIA, June 24, 1878.

To the Editor of The Iron Age—DEAR SIR: My opinion in relation to the proposed sale of the surplus stock of Screws by the American Screw Company is, that should the company deem it advisable to make a sale of their surplus stock any time previous to commencement of the fall trade—say 1st August next—it would be entirely satisfactory to a majority of the Hardware trade, provided the company would make an absolute sale of, say 300 to 500 cases in 5-case lots and upward, the balance to be withdrawn if prices realized are not satisfactory to the company. I hope to see the time when manufacturers of Hardware will carry no stock.

NEW YORK, June 22, 1878.

To the Editor of The Iron Age.—In your issue of June 20 (page 21), under the head of General Hardware, you make a quotation from a letter sent you by the American Screw Company which shows that, on one subject at least, the writer speaks without knowledge of the facts. Alluding to the proposed auction sale of Screws, the writer says: "We have a precedent for all this in the history of the coal companies, where the overproduction is very like that among the Screw companies. It is well known that some years ago the Scranton Coal Company inaugurated a system of public sales, contrary to the wishes of the other companies and against the judgment of the buyers, but to-day it is the chosen method of distribution adopted by the combined coal companies, and, contrary to all expectations, fully preferred by the jobbing trade."

If the writer of the above knew as much about the coal trade as he does about screw manufacture, he would not have been so ready to pass opinion upon the advantages and popularity of coal trade auctions. These auctions began years ago by the sale of Scranton coal by the Delaware, Lackawanna and Western Company. It grew out of a general fight among producers, and was intended to demoralize the trade. When the great combination broke two years ago the coal market was utterly demoralized. Nobody knew what it was worth, and the only apparent way out of the difficulty was to have recourse to sales at auction. There were at that time a few sales in which several of the large companies participated. The Pennsylvania Coal Company was the only corporation which repeated the experiment, the others becoming heartily sick of it. The Pennsylvania Co. held, I believe, three or four sales, and then returned to the old method with the others. At the present time the D. L. and W. Company is the only one which adheres to this method of sale. Its only advantage, even to them, seems to be that it gives them considerable cash in the early part of the month, as they demand an advance of 50 cents a ton on all purchases. Its disadvantages are that it forces coal upon the market regardless of the demand, which prevents that healthy relation between production and consumption which is necessary to a normal activity. If it had any conspicuous advantages the other companies would unquestionably adopt it.

Among the trade at large these sales are unpopular and are regarded as productive of demoralization. In the first place they publish the price to every one. They do not attract buyers to any large extent. The amount sold is always small compared to the supply, but the 50,000 or 100,000 tons sold makes the price for the whole production of the month. There are always some buyers in attendance to bid, but the greater number stay away, as those who desire assurances from other companies that they can purchase at the average prices of the sale, can generally get them. The only exception to this is found in the case of a rising market. An auction sale always exaggerates the tendencies of trade. If the market is weak and prices declining the bids are likely to go very low; if, on the other hand, the tendency of prices is upward, the bids are likely to lead the advance and cause serious fluctuations. In a word, an auction sale is a one-sided bargain, in which the buyer makes his own price and the seller has no recourse but to make good his offers. Again, it tends to place all buyers in a common line. The small dealer who wants 100 tons has the same advantage as the large dealer or consumer who wants 10,000. If he gets his bid in, he makes the price for the man who buys in one lot more than he buys in a year.

These are some of the reasons why the trade at large do not like the coal auctions. Another is that it crowds the whole business of the month into a few days. The trade is ordinarily completely demoralized for a week before, and from three to four days after the auctions. At the present time, when advances are announced each month by the combination, nearly all the business is crowded into the latter part of each month. If the American Screw Company think these sales are favorably regarded by the trade they must have got their information from the auctioneers.

Respectfully, L. H. C.

IRON.

American Pig.—There is not a particle of improvement to notice in the condition of the Iron market. The sales during the week are few in number, and for small quantities. We hear of some inquiry for favorite Lehigh brands, but at prices which are positively declined by the makers. The only sale of any consequence that we hear of is 500 tons No. 2 X Crane at \$16.50, delivered at purchasers' dock in New York; terms four months, with interest. This price is equivalent to a trifle less than \$14.50 at the works. We are informed that the Thomas Iron Co. have blown out one of their furnaces since our last writing. We quote as before: Foundry No. 1, \$16.50 @ \$18; Foundry No. 2, \$15.50 @ \$17; Gray Forge, \$14.50 @ \$16.

Scotch Pig.—The transactions during the week have been of a very trifling nature. We repeat former quotations, viz.: Glangarnock, \$23.75; Coltness, \$24, and Eglinton, \$22.75.

Rails.—No sales either of Steel or Iron Rails are reported since our last writing, and we continue to quote Steel at mill, \$43 @ \$44, and Iron, according to quality, terms, &c., \$32 @ \$36.

Old Rails.—In the absence of business we quote nominally \$17 @ \$18 as the market price here.

Serap.—We quote No. 1 Wrought from yard, \$20 @ \$21.

METALS.

Copper.—Sales for the week under review have not exceeded 150,000 lb Lake Superior, at 16 1/2¢ and subsequently at 16 1/4¢. Baltimore we quote 16 1/2¢, nominally. The London market is again 10¢ lower, the cable quoting Best Selected, at London, £60 @ £60. 10¢, and Chili Bars, £63 @ £63. 10¢. Mail advices have reached us from the same quarter dated June 15, and reading as follows: "Prices have been quoted slightly lower, but there has been no business of any importance to be obtained, and sellers will probably have to make further concessions, for buyers must be satisfied of their requirements before prices advance, and being supplied it is not likely that they will pay more than they did before, if as much, and there is no occasion for them to do so, the market being extremely inactive, and prices derive no strength from the demand; neither are stocks diminished, but quite the contrary—heavier than for many years past." The combination prices for Manufactured Copper are continued without change. Only an occasional inquiry for English Yellow Sheathing Metal, and the quotation is nominally 13 1/2¢, currency, in bond. American is very irregular, the price varying from 14¢ to 20¢, according to circumstances, the inside price only where English comes in direct competition. We quote: New Sheathing Copper 26¢; Braziers, 28¢, and Bolts, 28¢; American Yellow Sheathing Metal, 18¢ @ 20¢; Yellow Metal Bolts, 25¢, and English Yellow Sheathing Metal, 14¢, currency, in bond.

Tin.—The market remains as quiet as ever, and we have no important sales to report. Arrivals during the week sum up 1119 slabs Straits. We quote: Straits, 14 1/2¢; English Refined, 14 1/4¢; ditto Common, 14¢, and Banca, 17 1/4¢; all gold, large lines. Offers of 14¢ gold, are solicited for Straits Tin to arrive. London cables Straits, £62. 10¢, and Singapore has declined to \$18.25 per picul. We are in receipt of details from Australia, dated Melbourne, April 15, and reading as follows: "Great discoveries are reported at Mount Heamskirk, on the West Coast of Tasmania. The wash dirt at five feet was not bottomed. Nuggets of splendid Tin were obtained weighing two pounds. The discoverers expect to trace the lode in the mountain. It is expected that this discovery will rival that of Mount Bischoff." Tin Plates have been quiet. The cable reports an irregular market in England. We quote at the close, ordinary brands, large lots, gold, \$1 box, as follows: Charcoal Bright, \$5.87 1/2 @ \$6.12 1/2; ditto Ternes, \$5.50; Coke Tin, \$5, and ditto Ternes, \$4.87 1/2. Mail advices have reached us from Liverpool to the 13th inst. The export of Tin Plates from England to the United States during the first five months of the current year has been 41,992 tons, against 43,037 in 1877 and 36,109 in 1876; to Canada, 2057, against 3090 and 1816. These statistics are accompanied by the following remarks: "The buying when the low prices are taken is decidedly vigorous, and this indicates more faith in the future on the part of buyers than they have shown for some time."

Lead.—A sharp advance has occurred. Early in the week there were some orders to the extent of 400 to 500 tons at 3.20¢, currency, which remained unfilled. Soon after limits were raised and sales effected to the extent of 250 tons at 3 1/4¢, currency, followed by some small sales at 3.35¢, currency, when orders began to drop in for large lots at 3 1/2¢, currency; but even at this advance they could not be had. To-day sales have taken place at 3 1/2¢, currency, of such small lots as could be bought, orders for more remaining unfilled. The movement seems to be simultaneous here and at St. Louis, holders there having withdrawn from the market altogether. They write from England under date June 13: "Little has been doing on which to base exact lowest prices, and the following figures could, without doubt, be substantially shaded for contracts of any considerable extent. Spanish Pig, £16. 5/; English Pig, £16. 15/; and Sheets, £17. 10/." Cablegrams are to hand to-day quoting English Pig £17. 5/ @ £17. 10/ at London. This is an important improvement, and seems to indicate that peace will do Lead a great deal more good than war could possibly have done it. Lead having declined more than any other metal in both hemispheres during the past twelve months, it is, under a revival in trade in Europe and America, such as seems to be drawing near, most logically capable of a sudden and material rebound, and this recovery seems to be inaugurated now, if holders will but have confidence in their own property, and not be frightened by imaginary abundance. Manufactured is in fair request at the combination rates, which are unchanged. We quote: Bar, 4 1/2¢; Pipe, 5¢; Sheet, 6¢; Tin-lined Pipe, 15¢; No. 1 Solder, 8 1/2¢; all less 10¢ to the trade.

Spelter and Zinc.—From the moment a durable peace seems to be in prospect people in Europe begin to turn their attention to metals deserving support by reason of uncalculated depression, and next to Lead, Spelter has been the most down-trodden, hence the great speculative purchases that have been made for German, French and English account at Breslau of 24,000 cwt. "Godulla" at 16.85 marks; 25,000 cwt. P. H. at 17, and 10,000 cwt. Silesian Union at 16.75. According to latest mail accounts, dated 13th instant, nobody wanted to part with any more at less than 17.50 marks the 50 kilos. Here the market is still quiet, 50 tons inferior Common Domestic having changed hands at 4 1/2¢, currency, but we have seen letters from St. Louis just to hand, according to which a vigorous curtailing of production is contemplated, makers being tired of losing 1/4¢ to 1/2¢ pound all along on their output at prevailing rates. We quote the domestic article 4 1/2¢ @ 5¢, currency, for Common, and 8 1/4¢ @ 8 1/2¢, currency, for Refined. The latter is inactive. They write from London under date June 13: "A dull dragging market, with only a moderate business done, showing a gradual fall of 10¢ per ton during the fortnight. We quote ordinary Silesian £18, compared with £20. 5/ @ £20. 10/ same date last year." At the advance in Europe limits for Silesian at New York have been raised to 5 1/4¢ @ 5 1/2¢, gold. Stock here 20 tons. Sheet Zinc.—There is a moderate demand for Sheet, but trade therein is dull and prices are more or less nominal. We quote: Mosseman, 7 3/4¢ @ 7 1/2¢, gold, and Domestic, 6 1/4¢ @ 6 1/2¢, currency. Nickel.—Is steady in Europe and firmer here at \$1.20, currency, with a moderate trade doing.

Antimony.—The quotation in London on the 13th inst. was £49. We quote the same here 12 1/4¢ @ 12 1/2¢, gold. There is a fair jobbing demand.

COAL.

During the past week a considerable improvement has taken place in Coal. The to cent advance for July has driven a great many buyers into the market and largely increased the volume of business. The auction sale yesterday was marked by a small advance of about 6 cents. The Coal sold was mostly to large dealers, who probably hold for a rise. The larger sizes are mostly in demand. Some of the smaller sizes are a little slow. We give below the figures of the auction, for which we are indebted to Mr. F. E. Saward.

At noon yesterday the Delaware, Lackawanna and Western Railroad Company held its 154th sale of Coal, disposing of 50,000 tons of Scranton Coal, deliverable at the company's Coal wharf at Hoboken, N. J., during the month of July. The following were the prices:

	Sold at.	Average.
6,000 tons Steamer.....	\$3.47 1/2 @ 3.50	3.48 1/2
10,000 tons Grate.....	3.47 1/2 @ 3.50	3.48 1/2
10,000 tons Egg.....	3.37 1/2 @ 3.50	3.38 1/2
15,000 tons Stove.....	3.37 1/2 @ 3.50	3.38 1/2
7,000 tons Chestnut.....	3.25 @ 3.50	3.38

The following is a comparison with previous sales this year:

Size.	Jan'y	Feb'y	March	May	May
	30.	27.	27.	1.	20.
Steamer.....	\$3.10	\$3.11 1/2	\$3.25	\$3.30 1/2	\$3.42 1/2
Grate.....	3.12 1/2	3.07 1/2	3.21 1/2	3.30	3.45
Egg.....	3.14	3.15 1/2	3.40	3.45	3.50 1/2
Stove.....	3.17	3.15	3.09 1/2	3.70 1/2	3.75
Chestnut.....	3.11	3.00	3.10	3.15	3.25
Pea.....	2.12 1/2				

Many dealers expressed the feeling that the sale ought to have shown higher figures. As it is, however, it very accurately represents the market. It is, indeed, much better than the printed or written quotations, and gives a very fair idea of what is actually paid for Coal.

EXPORTS.

Hamburg.	Quan. Value.	Mt. iron, pkgs.	18	\$90
Copper, bales, 150	\$31,300	Pumps, pkgs., 49	1,718	
Pumps, bxs., 2	200	Cutlery, cs., 10	792	
Nails, pkgs., 39	105	P't'd w're, cs., 10	792	
Ag. imp., pkgs., 91	2,558	C'p'd mat., pkgs., 118	4,128	
Mt. iron, pkgs., 13	677	Cuplatine Republic.		
Handspikes, 132	132	Mt. iron, pkgs., 15	909	
Hdw., cs., 99	2,135	Hdw., cs., 157	4,323	

OLD METALS, PAPER STOCK, &c.

Business in Old Metals and Paper Stock still continues unchanged from the dullness previously noted. The market is without activity, and prices are about the same as last reported. There is a demand for bogus Manilla, but other stocks are without inquiry.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper, heavy.....	per lb.	\$0.13	@	...
Copper Bottoms.....	"	.10 1/2	@	...
Yellow Metal.....	"	.10	@	...
Brass, heavy.....	"	.10	@	...
Brass, light.....	"	.07	@	...
Composition, heavy.....	"	.11 1/4	@	...
Lead, solid.....	"	.05 1/2	@	...
Tea Lead.....	"	.05	@	...
Zinc.....	"	.05 1/4	@	...
Pewter, No. 1.....	"	.07	@	...
Pewter, No. 2.....	"	.06	@	...
Wrought Iron.....	prton.	\$16.00	@	...
Light do.....	"	9.00	@	...
Stove Plate.....	"	9.00	@	...
Machinery do.....	"	10.00	@	...
Grate Bars.....	"	3.50	@	...

The prices current for Rags, &c., are as follows:

Canvas, Linen.....	per lb.	3 c.	@	3 1/2 c.
" Cotton, No. 1.....	"	1 1/2 c.	@	1 3/4 c.
" No. 2.....	"	1 1/4 c.	@	1 1/2 c.
White, No. 1.....	"	3 1/2 c.	@	3 3/4 c.
" No. 2.....	"	3 c.	@	3 1/2 c.
Seconds.....	"	1 1/2 c.	@	1 3/4 c.
Mixed, Woolen.....	"	6 1/2 c.	@	7 c.
Soft, do.....	"	6 1/2 c.	@	7 c.
Gunny bagging.....	"	3 c.	@	3 1/2 c.
Jute butts.....	"	2 1/2 c.	@	3 c.
Kentucky bagging.....	"	3 c.	@	3 1/2 c.
Book Stock.....	"	2 1/2 c.	@	3 c.
Newspaper Stock.....	"	1 1/4 c.	@	1 1/2 c.
Waste Paper and Scraps.....	"	1/2 c.	@	3/4 c.
Kentucky Bale Rope.....	"	4 c.	@	4 1/2 c.
Oakum Junk, No. 1.....	"	4 1/2 c.	@	5 c.
" No. 2.....	"	3 c.	@	3 1/2 c.
Tarred Shaking.....	"	1 c.	@	1 1/4 c.
Grass Rope.....	"	1 c.	@	1 1/4 c.

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, June 25, 1878.

Pig Iron.—The market is without change, and sales are mostly on the basis of last week's quotations. The inquiry for small lots has been more active, and in this way quite a fair business has been done. At this season consumers carry a light stock as possible, and as many are preparing to close their establishments for stock-taking, repairs, &c., a very light business may be looked for during the next month or six weeks. Prices are fairly steady for known brands, and although sales at very low prices are reported, the market seems to be less feverish any excited than it was some time ago. Consumption is exceedingly light, however, and there is nothing in the outlook to warrant any anticipation of improvement in the immediate future. Ordinary lots of No. 1 Foundry Iron are quoted at \$17.50; average qualities nominally about \$18, while for others of very superior quality \$18.50 @ \$19 is obtained; No. 2 Foundry, \$16 @ \$16.50, and Gray Forge, \$15 @ \$16. Market dull.

Ores.—We quote Magnetic Iron Ores at \$2.50, f. o. b. at Hacklebarney mines, for "Blue" Ore, hand broken and selected. "Red" Ore, price \$2.75 f. o. b. cars.

Blooms.—The market is extremely dull, and it is exceedingly difficult to effect sales even at the reduced figures. We quote: Sunken Scrap Blooms (2464 lb), \$40 @ \$43; Northern Ore Blooms (2240 lb) \$37 @ \$39; best quality Charcoal Billets (2240 lb), for wire and steel purposes, \$50 @ \$52.50; Bars do., \$62.50 @ \$65; Sheet Iron Blooms, cornered (2464 lb), \$55 @ \$58; Cold-blast Charcoal Plate Blooms, \$51 @ \$53; run-out Anthracite, \$50 @ \$51.

Muck Bars.—Business is restricted to small lots, at about \$30 @ \$32, Philadelphia delivery, according to quality.

Structural Iron.—Without any special change to report, the outlook appears to be very encouraging, so far as regards the demand for Shaped Iron. The amount of orders on hand is very considerable, and with several important matters under consideration certain to result in actual business at some not very distant period, the mills have every reason to look for continued activity. Bridge work is being carried on to an important extent. The latest contract which has come under our notice is that for the Lehigh Valley Railway Co., at Towanda. The prospects for shipbuilding are also fairly encouraging, contracts for one, if not two, good-sized iron vessels will probably be closed here to-day, with intimations of others to follow. Prices are steady as follows: Angles, 2 1/2 @ 2 1/4; Tees, 2 1/2 @ 2 1/4; Beams and Channels, 2 1/2 @ 2 1/4.

Plate and Tank Iron.—Business in this department is in a fairly satisfactory condition, so far as the amount of work is concerned, several mills being quite full of orders and others busy in meeting the current demand. There are several inquiries in the market for moderate-sized lots, and it seems likely that the mills will have sufficient orders on hand to carry them well into next month, so that a short period in which the demand may fall off will not seriously affect the market. Prices on the whole are steady, but concessions may be made in case of specially desirable orders. We quote: Common Plates, 2 1/2 @ 2 1/4; Tank Iron, 2 1/2 @ 2 1/4; C. No. 1, 2 1/2 @ 2 1/4; Shell Iron, 2 1/2 @ 2 1/4; Flange Iron, 3 1/2 @ 4; Solid Firebox, 4 1/2 @ 5; and Best Bloom, 5 1/2 @ 6.

Sheet Iron.—Business is duller than usual, although this is the dull season of the year. There is positively no demand except for small lots, and these are not very frequent. The mills will probably shut down in course of a week from date, and unless the outlook improves it is likely the stoppages will be of longer duration than usual. We quote: Common Sheet, No. 24 to 26, 2 1/2 @ 2 1/4; No. 27 to 28, 3 1/2 @ 3 1/4; Refined Sheet Iron, No. 25 to 28, 3 1/2 @ 3 1/4; No. 22 to 24, 3 1/2 @ 3 1/4; No. 16 to 21, 3 1/2; Best Bloom Sheets, No. 25 to 28, 5 1/2 @ 5 1/4; No. 22 to 24, 5 1/2; No. 16 to 21, 4 1/2 @ 4 1/4; Common Red Plates, 5-16 to 18, 2 1/2 @ 2 1/4; American, R. G., 5-16 to 18, 3 1/2 @ 3 1/4; Best Bloom, 5-16 to 18, 4 1/2 @ 4 1/4; Philadelphia Russia, 6 @ 6 1/2; A. Patent Planished, 10 1/2 @ 11; B. Patent Planished, 9 1/2 @ 10; Bloom Galvanized, 40 @ 45; Refined Galvanized, 50 @.

Bar Iron.—There has been a little more demand during the past few days, but pur-

chases appear to have been small and to supply immediate necessities. Prices have weakened a little, nominally so at any rate, and 1.9¢ is now accepted by some who up to a recent date were firm at 2¢. Prices are very irregular, however, and the cutting in extras is even more general than formerly. There is some hope that toward fall business may assume a better shape, but there is nothing in view at present likely to change things for the better during the summer months. An order for hammered axles from an Eastern company has been received at the Pencoyd Iron Works, as also an order for rolled axles for the Pennsylvania Company. We quote Bars as before, say 1.5¢ for Common, to 2¢ for Best Refined.

Steel Rails.—The demand keeps up quite actively and several fair sized orders have been taken during the past week. The Erie Railway Company have closed for 20,000 tons, divided among four companies, at something over \$44, according to delivery. Other small lots, to the extent of 6000 or 8000 tons have also been closed, and the inquiries seem to show that the requirements of the roads are larger than was estimated during the early spring months. Winter deliveries are now being asked for; buyers find it difficult to place their orders for early delivery, and as some sellers are rather anxious for winter work comparatively low prices are accepted for deliveries to suit the manufacturer. The difference in prices is said to be such in some cases as to make it an inducement for buyers to wait as long as possible. We repeat quotations of last week, viz., \$43 @ \$45 at mills, according to location, with concessions for deliveries to suit sellers' convenience.

Iron Rails.—We are glad to note some little improvement in the demand, and also that contracts have just been closed by the Cambria Iron Company for lots aggregating from 15,000 to 18,000 tons. The larger portion, however, was bought and sold under somewhat exceptional circumstances, which in general terms may be stated as follows: A road in the Northwest, which was projected previous to the panic, came under the necessity of completing the work at once or of surrendering valuable franchises. By special arrangements they have been enabled to place the order for Rails as above, upon terms which would scarcely have been granted had it not been that the sellers had a large accumulated stock of puddled Bar on hand, as well as several thousand tons of Old Rails, all of which it was extremely desirable should be turned into other securities. In this way an arrangement was made which may probably be of mutual advantage, but under the circumstances the transaction will scarcely warrant the sanguine predictions of a great revival in trade which some seem to have made, based upon the above extensive order. Sales of several hundred tons in small lots have been effected during the week, and there are further orders in the market, one for several thousand tons, so that prospects are rather encouraging. Sales of light sections have been made at \$36, and for ordinary sections \$32.50. We quote the market steady at \$32.50 @ \$34.50, according to section, quality and terms of payment.

Old Rails.—The market shows signs of renewed activity, and although no large lots have been placed on the spot, there are inquiries which will probably lead to heavy sales in the course of the week. Prices, without being notably higher, are firm, and \$19.50 has been paid for one or two spot lots, quality being extra. We are also advised of sales of 5000 tons in two lots, deliveries in the interior of the State, at \$19.50, and this quotation seems to be the market rate for good lots. Common qualities may be had at \$18.50 and possibly less, the extreme figures being \$18 @ \$20, according to quality, terms, &c. Market steady and firm.

Scrap Iron.—The market is very steady and the supply not more than equal to the demand. Prices as before: Wrought, \$21 @ \$23; Cast, \$14 @ \$15.50.

Nails.—The market is in a badly demoralized condition, owing to several thousand kegs being thrown upon the market for whatever they would bring, cash on delivery. These nails were held by a large dry-goods firm, who had been supplying the manufacturers with merchandise for their store, and as they required to turn them into money, they put them on the market at almost anything over \$2.10 for round lots, prompt cash. The regular wholesale price is supposed to be about \$2.30, but there is no uniformity in rates.

Lead.—The market is dull at 3¢ for Common. Manufactured quiet at 4 1/2¢ for Bar, 5¢ for Pipe and 6¢ for Sheet, although a further decline is expected. Shot of all kinds will also be reduced on the 1st proximo.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, June 25, 1878.

There has been no improvement in general business, nor is it expected until after harvest. In Iron circles the feeling is particularly dependent, owing in part to the recent financial embarrassment of some prominent firms, whose aggregate liabilities foot up considerably more than a million of dollars. While these failures will fall with considerable severity upon the creditors, some of whom possibly are not in condition to stand up under them, yet they will not be without some good effects. In the first place they demonstrate very clearly that the firms in question have been doing business at a loss, selling their products below cost of production, and should serve as a warning to others, as it proves very clearly that such a course if persisted in can have but one ending, and that is ruin. Already there is a feeling among the trade, not only here but throughout the West, that it is much better to do nothing than to work at an actual loss, and the probability is that there will be a reduced production this summer, and even now but few if any of the mills here are turning out any more stock than is required to fill their orders.

Some of our manufacturers are hopeful of an improved business this fall, in view of the abundant crops, which promise to be unprecedented in the history of the country;

and, moreover, since the adjournment of Congress confidence has been restored, as the financial policy of the government as well as the tariff and other important matters will be permitted to remain undisturbed until next session.

Pig Iron.—To use a common phrase, the bottom has dropped clean out of the Pig Iron market; there is no demand deserving of the name and as there will likely be a pretty general suspension for a month or more, the prospect for the immediate future is by no means encouraging, either as regards demand or price. It is claimed by those who are in a position to know, that even those furnaces favorably located and supplied with all the latest appliances and improvements, cannot more than hold their own, under the most economical administration, and if this be so what is to become of these old time furnaces, unfavorably located, built before the discovery of new processes, and which of course cannot compete with the former? This question is easier asked than answered, but the probability is that very few of these old time furnaces will ever be started up again; for even when times do get better they, being behind the age, cannot be operated with any show of success. This being the case the production is likely to continue light as compared with what it was a few years ago, for some time to come, and with no stock, scarcely excepting that in the hands of producers, and with an increased consumption better prices may be obtained. But in the present condition of affairs, with no demand and a very limited consumption, the market could not possibly be in a much worse condition, and, as already stated, there is not likely to be any immediate change for the better. Bituminous Coal Smelted Irons quotable at \$19 @ \$20, 4 months, for Foundry, and \$16.50 @ \$18.50, 4 months, for Forge, the latter figure for standard brands of Red-short. Coke Irons—\$18 @ \$20, 4 months, for Foundry, and \$15 @ \$17, 4 months, for Forge. Hanging Rock Charcoal—\$20 @ \$22, 4 months, for Mill, and \$23 @ \$26 for No. 2 and Foundry. Bessemer Iron, dull; quoted at \$19.50, 4 months.

Manufactured Iron.—The demand for all kinds of Manufactured Iron continues to fall off and the market is generally reported dull. Some few of the mills still have a fair trade in specialties, but for the ordinary merchant the inquiry is light and prices very unsatisfactory. As stated in our last report, there is a general aversion on the part of manufacturers to accumulating stock, except what is necessary to keep up an assortment; and while the most of the mills are still running, but few if any of them are working up to anything like their full capacity. However, notwithstanding the depressed and unsatisfactory condition of affairs at present, the trade are hopeful of the future, and it is earnestly hoped that their expectations may be more than realized. In addition to curtailing production the recent failures will have a tendency to check selling at cut-throat rates, demonstrating as they do that selling goods below cost can have but one result, and manufacturers here aver that they will not accept orders unless there is a small margin for profit. We continue to quote on a basis of \$1.70 @ \$1.80, 60 days, for good Refined Bars, and one to two-tenths less for poorer stocks.

Nails.—The market continues in a very unsatisfactory and demoralized condition, as in addition to a light demand prices have been cut to such an extent that there is, to the manufacturer, no margin whatever. There are no established rates, each firm being at liberty to make their own prices, and consequently cutting has been the order of the day for some time past. We are cognizant of jobbers here sending out \$2.05 rates, with rumored sales as low as \$2, cash, and at the same time we are cognizant of manufacturers refusing to sell either in large or small lots under \$2.15 rates. It is not unfrequently the case that jobbers, when trade is dull, cut prices down below cost in first hands. We saw the copy of a letter from one jobber in the Northwest to another, offering to furnish from 1000 to 5000 kegs, for immediate delivery, at \$2.15, delivered there, or, as already stated, equal to bottom price of some of our manufacturers, delivered here. We would advise buyers to pick up all they can obtain within the range of the prices quoted, as in no event are prices likely to go any lower, but, on the other hand, the probability is that the Western Association will put up rates some of these days. But few of the factories in the West are in operation, and while stocks in first hands are small, jobbers, particularly in the far West and Northwest, are pretty well stocked, having taken advantage during the spring of the very low rates of transportation.

Horse and Mule Shoes.—The demand continues light, as it usually is this month, while prices remain unchanged. Shoeburges & Co. continue to quote their Junata brand in 100 keg lots at \$3.37 1/2 @ \$4.37 1/2.

Steel.—The demand is light as compared with what it was a month ago, yet manufacturers generally report business fair for the season, although they complain of low prices. Tool Steel, according to quality, 11¢ @ 13¢; most of sales at 11 1/2¢ @ 12¢. Machinery Steel, 5¢ @ 7¢; Spring Steel, 6¢ @ 7¢; Boiler Plates, 7¢ @ 8¢.

Rails.—The market for Steel Rails steady at \$44 @ \$45, cash, and delivered at mills. Steel Rail Ends—none in this market, and there is some inquiry for them; Steel Billets, \$43 @ \$44; Steel Blooms, \$41, cash, delivered at mills; Iron Rails in better demand; Cambria Mills reported sales three months ahead; quoted at \$33; Old Rails, in light supply here, with some inquiry; Ordinary quoted at \$19.50 @ \$20, cash, and special or extra lots, \$21, cash.

Wrought Iron Pipe.—The demand is rather better than it was a month or so ago, but it is still backward as compared with what it usually is at this season of the year; prices continue very unsatisfactory. Discount on gas, steam and water pipe, 60 to 65 ¢. Oil-well tubing and casing net cash.

Scrap.—The market is generally reported dull, although all that can be expected in view of the general depression in the Iron business. Prices nominally unchanged. No. 1 Railroad Scrap, \$22 @ \$22.50, net; Car

Wheels very dull, \$18 @ \$18.50, cash, to \$19, 4 mos.; Boiler Scrap, \$23.50 @ \$24; Car Axles, \$27 @ \$28; Car Springs, \$35 @ \$36.

Window Glass.—Is reported dull with no improvement in the demand probable this side of August. Discounts unchanged; car-load lots, 75¢, 60 days, 2 ¢ off for cash.

Coke.—There is no abatement in the demand but prices are no better, \$2.15 @ \$2.20 per ton, delivered free on cars in Pittsburgh. The Coke trade has been unusually heavy this year, the low price at which it is being sold having caused a largely increased consumption.

CHATTANOOGA.

Office of The Iron Age, Market and 8th Sts., CHATTANOOGA, June 25, 1878.

General business shows some decided signs of improvement. In fact the past week shows a better feeling among business men than is apt to prevail at this time of the year. In the metal trade the best sign is in the fact that the volume of production is fully maintained, except in the article of forge iron, and we are informed that one of the furnaces which blew out a few days ago will likely resume again in a short time. Prices are not likely to go any lower. Holders are not pressing to sell and are quite firm in their views, so that the present may probably be regarded as the bottom figures. The quality of Pig has been very decidedly improved in the past three or four months, which is giving better satisfaction to consumers, and this must soon have a favorable effect on sales of metal beyond the limits of the district. The market for Manufactured Irons has somewhat improved, though it has at no time been dull this year. We have had no hot weather this summer. The present week opened with a heavy, continuous, cool rain; it closes with fine, warm, breezy days and cool nights.

Pig Iron.—Trade is much as it was, consumers buying only to meet immediate wants and holders being firm in denying all pressure for concessions. The quotations cannot go lower, as the point has been reached which barely justifies furnacemen in keeping in blast. The quality of Irons will be improved in a more marked degree during the balance of the year than it has during the first months. Makers have learned that they must both economize expenses and make a superior article or their profits and their trade will disappear together. We quote: Coke Irons, No. 1 Foundry, \$17 @ \$18; No. 2, \$15 @ \$16; Gray Forge, \$13 @ \$14; White and Mottled, \$11 @ \$12. Hot Blast Charcoal—No. 1 Foundry, extra, \$20 @ \$21; do., \$18 @ \$20; No. 2 Foundry, \$16 @ \$18; Gray Forge, \$15 @ \$17; White and Mottled, \$15. Cold Blast Charcoal—Car Wheel Metal, \$22.50 @ \$27.50; do., Extra Standard, \$24.60 @ \$29.50; Forge, \$17.60 @ \$22.

Muck Bar.—\$27 @ \$34; Old Rails, \$16.50 @ \$17.50. Old Car Wheels, \$18.

Ores.—Brown Hematite, 50 to 56 ¢; 50 to 56 ¢; P. ton, \$1.70 @ \$1.90. The above prices for Ores delivered in Chattanooga on cars or on the wharf from flat-boats.

Nails.—Are brisk enough, but with the Upper Ohio River and Pittsburgh factories selling at \$1.90 at the factory and \$2.07 1/2 at Memphis, the chance for any profit at all is hardly visible. However, the rate of transport has kept Upper Ohio out of nearly all the Southern markets except the river towns, and our mills here have found plenty of business to keep them running without very materially cutting the rates they adopted when the Western Association made its compact fixing the price at \$2.40. We quote at \$2.25, with usual discounts on large lots.

Manufactured Iron.—The market somewhat more than holds its own. Merchant Bars are in good request. Bolts, spikes, &c., are brisk. The bar mills and those turning out the smaller articles of railway supplies have all they can do, with good prospects ahead for better trade in volume and some hope that in the future prices will improve. Bar we quote at \$2; Railroad Spikes, \$2.50, Light Rail, \$2.25; Track Bolts, \$3; Trestle Bolts, \$4.

Coke.—The market here is quiet, though the prospect that the workers of this district will eventually have to supply the furnaces in Central Alabama has given a decidedly more lively feeling to the trade. Dade and Sewanee have contracted with the management of Oxmoor furnaces, near Birmingham, Ala., to furnish them an experimental lot of 500 tons, part of which has been delivered. If this proves satisfactory a permanent arrangement will follow. This Coke will be delivered at the furnaces at \$4 per ton. The transportation by rail for Sewanee is 240 miles, and for Dade about 200 miles. We quote at \$2.50 per ton, on cars, in Chattanooga.

Coal.—We quote run of mine to manufacturers at \$1.50 @ \$2 per ton, on cars, at Chattanooga.

BOSTON.

JUNE 22.—Pig is dull, and, in spite of a new steadiness in freights, the market must be called weak. We quote: \$19 for No. 1, \$18 for No. 2, and \$17 for Gray Forge. Bar continues quiet and easy, quoting \$39.50 for Refined and \$34 @ \$35 for Bolt; American Rails, \$32 @ \$37; Steel Rails, \$42 @ \$43, from mill. Nails are in light demand at unchanged prices. Sheet is selling at 3¢ @ 3 1/4¢ per lb. Russia is quiet at 10 1/4¢ @ 11¢. We quote English Spring Steel at 7¢ @ 8¢, gold; 9¢ @ 11¢ for German; 9¢ @ 11¢ for Machinery; 14¢ @ 15¢ for Cast; 10¢ @ 12¢ for Blister; 8¢ for American Spring; 13 1/4¢ @ 14¢ for Cast; 9¢ for Blister; and 8¢ for Machinery. Manufactured Iron of all kinds continues to meet with a very light demand. The nail manufacturers, since the break-up of their combination, are selling their products at all sorts of prices. The directors of the reorganized Erie road have received bids for Steel Rails averaging \$44.75 per ton. They expect to complete a third rail in a short time. Copper.—Ingot is a little firmer since the large sale in London, but there is very little doing in London, and small lots of Lake here at 16 1/2¢ @ 16 3/4¢. The American manufacturers of Yellow Metal Sheathing are now freely competing with the English, and have sold tv o

large suits here recently at 16¢—one of 2000 sheets. For vessels engaged in the home trade the price continues 18¢, with 10¢ for old in exchange. The English manufacturers are selling at 13¢. There is no vessel on the dock, we believe, since Emery's new bark, the Penobscot, was completed. An important point to be considered in buying English Sheathing is that English manufacturers do not make our kind of cut nails, but pursue the old method of casting, and, as this adds 3¢ @ 4¢ to the cost, consumers here of foreign Sheathing have to buy American Nails. Our manufacturers will not sell their Nails to a buyer of foreign Sheathing at less than 20¢, while a buyer of American Sheathing get the Nails at the same price as the Sheathing—say 16¢. In a suit of say 2000 sheets, amounting to 12,000 pounds, 2000 pounds of Nails are required. For Manufacturers we quote: New Sheathing, 26¢; Bolts and Braziers, 25¢; Yellow Metal Bolts, 20¢; do. Sheathing, 18¢. Lead is weak and again lower. Two cars sold at 3 1/4¢. The Chadwick Lead Works have secured the contract for furnishing Lead Pipe for the Boston Water Works. We quote: Pig, 3 1/4¢ @ 3 1/2¢; currency; Sheet, 6¢; Pipe, 6¢; Tin-Lined Pipe, 15¢; Bar Lead, 5 1/2¢; all of these, excepting Pig, are subject to the usual trade or 10¢ discount. Antimony is quiet at 12¢ @ 13 1/4¢, gold, for Boston spot lots. Spelter is easy, closing at 4 1/2¢ @ 5¢ on the spot for 10-ton lots. Tin is dull and unchanged. We quote: Straits, 14 1/2¢ @ 14 3/4¢; Banca, 17 1/4¢ @ 17 3/4¢; Refined English, 14 1/4¢ @ 15¢, gold. We quote Plate: Charcoal, I. C., \$6 @ \$6.25; Coke, \$5.25 @ \$5.50; and Terne, \$5.50 @ \$6, gold.—Commercial Bulletin.

ST. LOUIS.

Specially reported by Messrs. SPOONER & COLLINS, Iron Commission Merchants, 217 North Third street, St. Louis, under date of June 20: Pig Iron has been only in fair demand the past week. Prices rule about the same. Southern Irons have to a large extent been withdrawn from the market at the present low prices. In most instances the standard brands are held for an advance. Old Rails are in very little demand, and prices low. Very few of our mills and foundries are running, this being their dull season. Stocks of Iron are very light, and with the present prospect of good crops we anticipate a good trade this fall.

	No. 1.	No. 2.	Mill.	White and M't'd
M'souri Stone Coal	\$22.00	\$20.00	\$19.00	\$17.00
Missouri Charcoal	20.00	19.00	18.00	16.00
Tenn. Charcoal	20.00	19.00	17.50	16.00
Tenn. Coke, very soft and strong	20.00	19.00	17.00	15.00
Hang. Rock Charcoal	24.00	23.00	21.00	20.00
Hang. Rock Coal, Cold-short	23.00	21.00	20.00	Extra
Extra No. 1	No. 1	No. 1	No. 1	No. 1
I. M. Ore.	I. M. Ore.	I. M. Ore.	I. M. Ore.	I. M. Ore.
Extra No. 1	No. 1	No. 1	No. 1	No. 1
Hang. Rock Coke	23.00	22.00	21.00	19.00
Moxahala Black-band Ore	23.00	22.00	21.00	19.00

COLD-BLAST CHARCOAL—All Numbers.			
Hanging Rock	4 mos.	\$28.00	@ 33.00
Tennessee	4 mos.	25.00	@ 30.00
Kentucky	4 mos.	25.00	@ 30.00
Missouri	4 mos.	25.00	@ 30.00
Georgia	4 mos.	25.00	@ 30.00
Alabama	4 mos.	25.00	@ 30.00
Assorted Bar Iron	4 mos.	25.00	@ 30.00
No. 1 Railroad	4 mos.	25.00	@ 30.00
Heavy Cast Scrap	4 mos.	25.00	@ 30.00
Light	4 mos.	25.00	@ 30.00
Old Rails	4 mos.	17.00	@ 18.00
Old Car Wheels	4 mos.	17.00	@ 18.00

CINCINNATI.

Messrs. E. L. HARPER & Co. (successors to Messrs. L. R. HULL & Co.), under date of June 22, write us as follows: There has not been any noticeable variation in prices since last report, and it is not probable that any lower prices will be touched even during the present dull season. The stocks in the hands of buyers are light, and very few have now at any time over 30 day's supply on hand. The amount in hands of sellers is also reduced, and is mostly held by parties who need not press the market should they see decided evidence of its being more profitable to hold. Any decided improvement in general business would soon be felt by the iron interests, and it can be predicted with tolerable certainty that with the ushering in of the fall trade the market will be much more regular and satisfactory, even if prices do not advance beyond the figures now nominally ruling. We continue to quote:

HOT-BLAST FOUNDRY.			
Hanging Rock C. C., No. 1.....	\$21.50	@	22.00
" C. C., No. 2.....	19.00	@	20.00
Alice, No. 1 Extra, L. M.....	20.00	@	20.00
" No. 1, N. O.....	19.00	@	20.00
" No. 1, N. O.....	18.00	@	20.00
Hanging Rock Coke and S. C., No. 1.....	18.00	@	20.00
" S. C., No. 2.....	15.00	@	17.00
Virginia Coke, No. 1.....	19.00	@	20.00
" No. 2.....	17.00	@	19.00
Shawnee S. C., No. 1.....	18.00	@	19.00
" S. C., No. 2.....	16.00	@	17.00
Hocking Valley S. C., No. 1.....	18.00	@	19.00
" S. C., No. 2.....	16.00	@	17.00

FORGE IRONS.			
Hanging Rock, No. 1 C. C.....	18.00	@	19.00
Hanging Rock, No. 1 Coke.....	16.50	@	17.00
Longdale, No. 1 Coke.....	16.50	@	17.00
Ala. and Tenn. No. 1 C. C.....	16.50	@	17.00
Red-short, No. 1 Coke.....	18.50	@	19.50
Red-short, No. 1.....	15.50	@	16.00
and Rails, prime.....	19.00	@	20.00

1995, as almost 951 tons same date last year. Zinc as before. *Antimony and Quick-silver unchanged.*"

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Thirty-seven firms, located in different parts of the oil country, and embracing all those engaged in the manufacture of oil-well tools from the upper to the lower district, announce that on and after June 1 they will sell their goods only for cash on delivery. Commenting upon this, the Titusville *Herald* says: There is no break in their ranks and no dissenting voice. The evils of the credit system are so widespread that this step has become necessary, and the cash system will work good not only to the trade, but to the producer as a class. The facility of giving and getting credit has stimulated production and offered a premium not only to financial looseness, but to actual dishonesty. The cash system will make all more conservative in their operations; and if dealers can avoid bad debts and doubtful credit prices will in the end decline to a level consistent with legitimate business profit, and the whole country will be the gainer.

INDUSTRIAL ITEMS.

MAINE.

The repair shops of the Maine Central Railroad Company, which for years have been located in Augusta, are to be shut down in a few days. The machinery, &c., is to be removed to Waterville, where all work of that description will hereafter be done.

NEW HAMPSHIRE.

The Humphrey Machine Company, of Keene, have recently shipped a lot of barrel machinery to Germany on orders, and a set of clothes-pin machinery to the Provincial Reformatory of Canada, and home work is reported much more abundant than last year. They are now making a 5-foot turbine water wheel for John Chace & Son, of Webster, Mass., and a 5½-foot wheel for the Richmond Paper Mill, at Lowell.

VERMONT.

The Howe Scale Company are fast removing their property from Brandon to Rutland. Several car loads have already gone, and there are many more to follow. The molders have already stopped working in Brandon, and in a few days the other men will stop.

MASSACHUSETTS.

The machinery in the mill of the Agawam Iron Works, Wareham, has been so changed that the same amount of work is successfully done with less than half the amount formerly used.

The Chase Manufacturing Company of Orange have a fair prospect for summer work, though the sale of machinery, shafting, &c., is now less active than early in the spring. They received work before last an order for all the machinery for a large lumber mill at Livermore, N. H., and shipped a 54-inch water wheel and other works to a mill in Maine.

Mr. Frederick Atkins cut 92 kegs rod, nails in five days last week, at the works of the Mount Hope Iron Company, Somerset.

CONNECTICUT.

The failure of Langdon & Co., the iron manufacturers, at Chapinville, on the Housatonic Railroad, with liabilities of \$100,000, has made a great excitement at Great Barrington, where, among other creditors, the Mahanaw National Bank is involved to the extent of \$28,000. It is said that they will be able to pay no more than 10 cents on a dollar.—*Springfield Republican*.

A pistol firm in Norwich has received a large contract from the Russians.

The Hazard Powder Company of Hazardville have discharged about a dozen hands, and are shutting down Fridays and Saturdays.

NEW YORK.

The Rensselaer Iron and Steel Company, Troy, are busy in all departments, except in the nail and spike department, in which they are doing very little. Their horse-shoe department is gradually increasing in product.

The Burden Iron Works, Troy, are doing a very heavy business in horse shoes. Their improved shoe is taking very well, and they are receiving large orders from the New York city and California markets. Of their two blast furnaces but one is in blast.

The two blast furnaces of the Jagger Iron Company, Albany, are out of blast.

The commissioners of the new capital at Albany have awarded the contract for five hydraulic power elevators to the Howard Iron Works of Buffalo. Four of the elevators are for passengers and one for freight. The amount of the contract was \$25,025, exclusive of the inside finish of the cars.

The Rome Rolling Mills are to run day and night on a large order.

Over 100 tons of machinery and fire-brick has arrived for Bowen & Signor's new rolling mill, at Saranac.

On Thursday last the Albany and Rensselaer Iron and Steel Company finished forging a round steel shaft 22 feet and 9 inches long by 6½ inches in diameter, weighing 2347 pounds. It was made to the order of the New York and Lake Champlain Transportation Company for a propeller shaft. The forging was accomplished by an 8-ton steam hammer from an ingot 15 inches square. This is the largest shaft the Albany and Rensselaer Iron and Steel Company have yet made, but not the heaviest forging. Steel forgings are demanding a large share of their attention, and they are putting in several new hammers, one of which, a 4000-pound helve hammer, is now being built at the Cuyahoga Works, Cleveland, Ohio.

NEW JERSEY.

The Newark Journal says: Mr. Oscar Barnett, manufacturer of malleable and gray iron castings, at the corner of Hamilton and McWhorter streets, has been busy for the past two months, running full time, with 120 employees. A specialty is in brass-molders' flasks, which are sent to Cleveland and other cities in Ohio, Boston, Chicago and to many places in Canada. This is the only factory in the country that makes a business of making these flasks. A patent porcelain-lined lemon squeezer made here squeezes the lemons for the punch made in London, and for the lemonade of all the realms of the Kaiser Wilhelm. During the month of May 100 dozen of these little articles were sent to London. Mr. Barnett makes large quantities of castings for the toy trade. Another specialty is a patent folding rack with five double hooks, that can be folded so as to put in the pocket, and yet each hook is strong enough to bear a man's weight. These are sent in large quantities to South America and Japan. The egg-beater "Best of All" is made by Mr. Barnett. He has recently supplied the Central Park Museum with seven tons of Gavitt's patent shelf brackets, and anticipates a second order from that place soon. He also made the brackets now in use at the Smithsonian Institute, Washington, and within a month the Museum of Natural History, Boston. On Monday of this week he filled a large order for the Museum of Comparative Zoology, at Cambridge, Mass.

The Tomlinson Spring Works at Newark employ from 70 to 80 hands, supplying, be-

sides Newark carriage makers, Brewster & Co. of New York and other leading firms in that city, all of whose springs they make. In a busy time the works turn out 250 to 300 pairs of springs per week.

F. B. Kuehnhold & Co., Newark, manufacturers of bits, buckles and coach and carriage hardware, have made and sold more goods this year than last, but the margin of profit has been lower, so that they have not made any money. Their trade is almost exclusively in gold, silver and nickel-plated goods.

PENNSYLVANIA.

At the Paxton Rolling Mill, in Harrisburg, a plate of iron 65 feet in length, 20 inches wide, three-eighths of an inch in thickness and weighing 1300 pounds, has been turned out for the purpose of exhibition in the parade on the 4th of July in that city.

Mr. A. Bates Grubb, of Mount Hope Furnace, has in contemplation the erection of another furnace somewhere along the line of the Lebanon Valley Railroad.

The fork and shovel factory of Myers & Ervin in Cheltenham require their force of men to work until 9 o'clock in the evening so as to fill the advancing orders that they are now receiving.

Messrs. Heebner & Sons of Lansdale have just sent ten car loads of their famous horse-power threshers and cleaners to Amherst, Nova Scotia. This firm are now sending to the Southern States on an average two machines a day.

Magnetic ore has been discovered on a tract of land owned by Adam H. Schwartz and John Kissinger, on Mount Penn, about half a mile north of "Drenkel's Field." The ore was found at a depth of about 40 feet from the surface, and the vein is believed to be about 3 feet thick. The premises have been leased to John Withers, who is engaged in digging a new shaft.

The rolling mill at Brownsville has commenced running double turn.

The coke ovens formerly operated by T. W. Watt & Co. at Dunbar are now idle.

We clip the following from the Sharon Herald of the 21st inst.: At the Westernman mill, puddle, guide and hoop mills double turn; bar mill single; sheet mill off one day; nail factory still off, but the hot machines are still going. Blast furnace No. 1 is blown out for repairs. This furnace has made a good record for Mr. Walker, the foundryman; the blast lacks a week of 21 months' duration, and the books show a yield of a nice fraction over 21,000 tons of iron in that period. During the big railroad strike the furnace was off ten days, which, considering the time consumed in getting ready to dampen down, and the time used in slow running after the blast went on, it would be safe to call two weeks' lost time. This is certainly a good general average. Work will be commenced on it as soon as it is cold enough. No. 2 working off smooth and even, as usual. At the Kimberly Mill, old hoop, guide and puddle mills double turn; bar mill single turn; new hoop mill still off; puddle mill and nail factory off Saturday, on account of changing the supply of steam of the ore pulverizer for fix from the mill boilers to the ones at the blast furnace. Nothing special from the Stewart Works; same as last week; still running, still shipping iron, and still wearing a general look of contentedness. In West Middlesex, at the mill, six furnaces on, six heats a day, and selling the muck iron as fast as made. Another furnace going on this week. At Greenville the mill, all but the puddle department, is in operation. This works hinges on the Atlantic Works, in Sharon; they sink or swim together.

In the Titusville Machine shops, unmarried men are allowed to work but half time. There is but one furnace in blast in New Castle.

The stove foundry of Orr, Painter & Co., at Reading, which has been running steadily since the late reduction, will shut down on Saturday, the 29th inst., for a period of about six weeks.

The National Locomotive Works at Connelville have shut down.

The puddle mill of the Co-operative Iron Works, Danville, which had been idle for some time, started on Tuesday, the 18th inst.

A. G. Green, Esq., of Reading, bought the Bernville Machine Shops at sheriff's sale for \$5750.

Twenty-seven thousand tons of iron ore reached Harrisburg over the Cumberland Valley Railroad last year, from the mines owned by the Reading Company near Boiling Springs, Cumberland county.

Noelle & Levy have shipped a large marine boiler to Jacksonville, Fla. The firm are also constructing a 15-ton ice-making machine to go to Bolivia, South America.

Ten car-loads of threshers and cleaners, manufactured in Lansdale, Montgomery county, were shipped from Philadelphia to the extreme head of the Bay of Fundy last week.

The Pennsylvania Steel Company, of Harrisburg, have within the last 18 months received 26,726 car-loads of material from the Pennsylvania Railroad. The usual number of cars received per day is from 80 to 100; largest number received in one day, 156. A large proportion of these are sent out laden with productions—rails, large and small frogs, brooms, billets and railroad supplies. The largest day's shipment of rails during the period was 800 tons.

Pott & Bro., boiler makers, of Lebanon, have contracted with the government for the construction of 300 buoys to be used on the Delaware and Hudson rivers.

PITTSBURGH AND VICINITY.

Messrs. Lewis, Oliver & Phillips have engaged in the manufacture of steel wire, similar to that made by Anderson & Passavant for the bridge now in course of erection over the East River between Brooklyn and New York.

The South Side coal firm of Joseph Keeling & Co. has been merged with the Birmingham Coal Company, limited, recently organized.

Duncan & Sons, of Tenth street, South Side, recently shipped a car load of their glassware to the Sandwich Islands.

Mr. Wm. Clarke, of the firm of Wm. Clarke & Co., of Pittsburgh, sailed last week from New York in the steamer Bothnia for Europe, to be absent until the 1st of September.

The repairs at Richards, Hartley & Co.'s works, Pride street, Pittsburgh, are about completed, and they will be ready to start in a few weeks.

Mackintosh, Hemphill & Co., Pittsburgh, shipped to the Cambria Iron Company, at Johnstown, recently, a large bloom shear for the Cambria Company's new blooming mill. The shear is designed to cut steel blooms 8 inches square.

Kirkpatrick, Beale & Co., of the Leechburg Iron Works, manufacturers of all grades of fine sheet iron, tin andterne plates, &c., are running their works day and night, and selling all of their products that they can make. No coal is used in the puddling or heating furnaces or under the boilers in these works, natural gas being the only fuel employed.

The iron and steel manufacturing firm of Reese, Graff & Woods, of Pittsburgh, closed their works on Tuesday night, 18th inst., owing to financial embarrassment, and will not start them again till some arrangement has been made. The firm have the sympathy of the community at large, as well as that of their employees, the latter, to the number of some 500, offering their labor for a time without compensation in the event of the resumption of work. The liabilities are something over \$400,000. The plant represents an investment of over \$500,000, and there are other large assets, such as stock in various stages and good accounts, showing a large and active business. The firm also have large orders and contracts which promise a remunerative business for the season.

VIRGINIA.

The Richmond Stove Company, of Richmond, has been reorganized by the addition of new stockholders and capital. The high reputation for superior work enjoyed by this company has secured to it a large field of operations, the prosecution of which will now, with the increased facilities, be vigorously entered upon. Mr. James M. Talbott is president and Mr. H. Clay Chamblin secretary of the company.

OHIO.

We take the following items from the Youngstown Register and Tribune of June 20: Brown, Bonnell & Co., are running full with the exception of the puddlers, in all departments of their mills. Cartwright, McCurdy & Co.'s finishing mills have been running double turn all week. On Monday next all departments of both mills will be started double turn. There are good prospects of running steady all summer. The seven and eight-inch finishing mills at the Youngstown Works have been running double turn. The squeezers of this mill, broken a week ago, have not been repaired, and will not be before the middle of the week. The United States Iron Co., manufacturers of cotton ties, of which Councilman Francis Miller is superintendent, is working full night and day, giving employment to 70 men and boys. This week they shipped 13 cars of finished ties to the South. These works are located about 100 yards east of the Youngstown Rolling Mill, and have been in operation about four weeks. Arms, Bell & Co.'s nut and bolt factory is running full time, and all are busy manufacturing machine bolts and bridges. They employ about 75 hands. At Wm. Tod & Co.'s machine shop several machinists are kept busy. They have just finished a large order of cotton ties for J. Painter & Sons, Pittsburgh. The Morse Bridge Works, under the supervision of Mr. Julian Kennedy, present a lively appearance. They employ 35 hands and have at present 27 orders for their bridges. They have already made one bridge, and next week will begin putting another together. Only one of the Hinrod furnaces is working. The machine shop of Booth, Miller & Co. is running full tilt. The foundry is working about half time. Altogether our cities' industries may be said to be in good shape. The puddlers at Brown, Bonnell & Co.'s are idle, as before stated, but there is the utmost good feeling existing between them and the company, and outside malcontents cannot disturb this harmony. The company's position is that they have shut down their puddling department for the reason that the price of iron will not justify keeping it going. There is no dissatisfaction with the men, and no controversy about price.

The Union Steel Screw Works, Cleveland, are running on eight-hour time, with 60 men and 100 girls employed.

Taylor & Boggis, Cleveland, makers of light gray iron castings, have 130 workmen employed on full time. They have lately been compelled, through increase of business and for want of room, to lay a brick floor on the second story of their building, which is used for an additional molding room.

The American Cast Steel Company are receiving numerous flattering reports in regard to the high quality of their product and assurances of large orders when stocks on hand are worked down. Meantime they are making about 1500 pounds of steel per day.—*Cleveland Trade Review*.

The South Cleveland Advocate says: On Tuesday, the 18th inst., the rail mill commenced working three eight-hour turns per day, thus giving employment to one-third more men. This arrangement will be adhered to through the hot summer months.

The Worswick Manufacturing Company, brass and pipe works, at Cleveland, are working full time, with 50 workmen, and all the orders they can attend to.

The following items are from the Akron Beacon of June 12th: Very fine and superior machinery is now being placed in the Cuyahoga Paper Company's new works at Cuyahoga Falls. When the new mill is in operation its capacity and general product will be second to none in this part of the world.

Many of the departments of the Buckeye Works are now running on extra time, owing to the unparalleled press of orders. An additional 150 harvesters will yet be manufactured this season, and 300 table rakes have just been ordered, making 900 more than are usually put up.

Messrs. Camp & Babb, of Cuyahoga Falls, were yesterday awarded the contract for constructing the new building at that place for Messrs. Turner, Parks & Co., and to be occupied by Mr. P. H. Standish in the manufacture of saddle's hardware.

The Klotz & Kromer Machine Company,

of Sandusky, are making large numbers of turbine water wheels for the Tornado Wheel Co. of Bellevue. This wheel is made under patents granted to Mr. Shirk, and although new, has already received high testimonials. The Klotz & Kromer Company are also making under their own patents the Hero Reaper. This is their first season. At a recent trial 20 acres was mowed by a Hero Reaper in 12 hours.

Messrs. R. B. Green & Co., about June 1, commenced operations in the manufacture of boilers of all kinds at No. 88 East Front St., Cincinnati. They are at this time quite busy, having about twenty boilers to complete between now and Sept. 1. They are now putting in a set of rolls 7 feet 4 inches in length for rolling boiler iron. These are said to be the largest rolls used in the city for that purpose. They also build the Whitwell hot-blast stoves, and attend to all kind of work pertaining to the erection of blast furnaces. They will largely increase the present capacity of their works during this year in the way of tools of the most approved patterns.

The Revolving Scraper Co. of Columbus are now manufacturing a fine contractor's plow as a companion to their revolving scraper, which is highly spoken of. This company report frequent inquiries for their goods from Central and South America, and have made recent export shipments to England, Germany and other foreign countries. Their patent folding garden barrow is very popular on account of its convenience for packing for shipment.

GEORGIA.

The Cherokee Furnace, in Polk county, has been delayed in starting again, but will now be in blast in a few days (cold blast). Their car-wheel iron is being introduced and gives entire satisfaction, being strong and possessing a superior chilling quality. They also make a hot-blast iron which is valued by foundrymen on account of its special softness and strength. This furnace pays special attention to the careful grading of iron.

KENTUCKY.

The Louisville Rolling Mills are still idle. These mills—the Kentucky and Louisville—were consolidated some time ago, and are complete in machinery in excellent running order. Capitalists desiring to engage in the manufacture of best grades of merchant iron, light and heavy shafting, &c., could find special inducements to invest at these works.

The Licking Furnace at Newport is running steadily, making a soft and fluid iron for foundry purposes, especially for stoves, with mixture of strong brands of pig or scrap.

The Licking Rolling Mills are running as usual on superior brands of merchant bar, heavy and light shafting, &c.

NEBRASKA.

The Omaha Nail Works, we notice by the Bee of that city, is at last an actuality. A stock company has been organized, a board of directors chosen, and the following officers elected: president, G. T. Walker; vice-president, G. W. Lininger; secretary and treasurer, C. B. Birkett; superintendent, R. W. Wilson. The president, secretary and superintendent were appointed a committee to conclude arrangements for the location of the works, the erection of necessary buildings, the purchase and transportation of machinery, &c. Active measures will be taken from this time forward, says the Bee, and the works will be put in operation as soon as men and means can accomplish it.

MISSOURI.

The Lone Elm Mining and Smelting Co., at Joplin, have just completed four new blast furnaces, which will give the works the capacity for smelting about 100,000 pounds of mineral per day, or 700,000 pounds per week, when run to their full capacity. To keep the smelting works in constant operation, the company have made arrangements to smelt the ore of several other mining companies besides their own. This large addition to the smelting capacities will compel the White Lead Works to increase their capacity if they continue to utilize all the smoke of these furnaces.

KANSAS.

The new zinc works of Robert Lanyon & Co., at New Pittsburgh, will be ready for operation in a few days. The works will start with a smelting capacity of 12 tons per day, which will be doubled in the course of the year. They will employ from 35 to 50 hands. The power will be furnished by a 50 horse-power engine, which is already in running order.

MICHIGAN.

The following, from the Marquette Mining Journal, is a statement of the lake shipments of ore and pig metal in gross tons for the season up to and including Wednesday, June 19:

FROM MARQUETTE.

Rolling Mill.....	5,766	Cleveland.....	26,489
Lake Superior.....	31,725	Humboldt.....	2,534
Mitchell.....	858	McComber.....	3,011
Edwards.....	3,179	Marquette.....	1,220
Republic.....	64,065	Winthrop.....	768
Champion.....	16,925		
Keystone.....	779	Total.....	157,520

FROM L'ANSE.

Michigan.....	8,596
Stewart.....	1,130
Total.....	9,726

FROM ESCANABA.

Jackson.....	19,057	Mitchell.....	106
South Jackson.....	3,593	Cambria.....	1,118
New York.....	7,584	Goodrich.....	1,527
Cleveland.....	1,184	Bessemer.....	1,704
Angeline (hard).....	10,061	Smith.....	2,304
(hematite).....	1,393	Vulcan.....	10,803
Barum.....	8,412	Quinnesec.....	8,143
Saginaw.....	20,004	Breen.....	680
Salsbury.....	13,500	Cleveland (hem'ite).....	1,498
Palmer.....	3,294	Emmett.....	716
Michigan.....	4,878	Howe.....	791
Superior (hard).....	3,649	N. York (hematite).....	4,495
McComber.....	2,174		
Winthrop.....	4,412	Total.....	135,490

Pig Iron.

Carp River Furnace.....	1,557
Pioneer Furnace.....	580
Total.....	2,037

Quartz.

Carp River Iron Co.....	199
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How Iron is Introduced into a New "Office Building."—The building just commenced for the Morse estate on the site of the old Park Hotel, corner of Nassau and Beekman streets, will in several respects be a remarkable structure. The materials will be wholly of brick and terra cotta, without any stone for sills or lintels, or even for the foundations. The effect in color externally will all be in red and black, as introduced in segmented arched windows, ornamented courses or an occasional pattern, and in the cornice. The walls will rise on a "step-up" with splayed footings, from a foundation of concrete 2 feet deep and 8 feet wide, diminishing from 4 feet in the sub-cellar and basement through the eight upper stories to 16 inches at the top. The floors and roof will all be sustained by iron beams, those for the former 15-inch, and the partitions will be of angle iron covered with iron lath. The ceilings, too, will be of iron lath, attached to the floor beams by Hoyt's patent corrugated iron, forming an arch between the several beams, filled in above with concrete. The aim is to erect a structure absolutely fire-proof. The first floor will be adapted to banking purposes, and all above, on either side of a spacious central hall, will be subdivided into smaller offices. By means of an open shaft with fixed tackle in the roof, safes can be removed; the hoist covers are to be of illuminated tile, Dale's patent. There will be two elevators; heat will be supplied by direct radiation in each apartment, and a tank near the roof, with driven wells in the cellar, in addition to Croton, will furnish water. The structure will be finished next April at a cost of \$175,000.

Torpedoes and Ammunition for Russia.—We learn on apparently good authority that on Saturday last a contract was closed for 50 Lay torpedoes for Russia. Negotiations have been pending for some time, and the result just noticed having been reached with deliberation, is all the more significant as to the probabilities of continued peace in Europe. As a single torpedo of the Lay pattern costs \$15,000, the amount involved is about \$750,000. Reference was made in our last issue to a shipment of about 80 tons of rolled cartridge metal on Russian account from the brass works of Brown Bros. in Waterbury, Conn. This is understood to be the second or third already made under a contract closed a few months ago, the whole covering some 6000 tons, to be delivered in the course of three years. The steamer John Bramhall is at New Haven awaiting orders for the transportation of war material to Constantinople. What will be done with the installment of arms due under the old Henri-Martini contract with the Providence Tool Co., or for shell and cartridges from the Winchester Repeating Arms Co., is not yet known.

Boiler Explosion at the Chesapeake Nail Works.—Four large boilers in the puddle mills of the Chesapeake Nail Works, Harrisburg, Pa., exploded June 25th with tremendous force. The mill was almost entirely demolished. Chambers Bowermaster, a foreman, was horribly mangled and instantly killed. Henry Nair, John Hess, George Frank and John Hetrick were badly scalded and injured by falling debris. One of the boilers was carried over an adjoining mill 65 feet in height, and landed in a field about 350 feet from the scene of the explosion; another was blown through the top of the mill into a brick warehouse; a third was carried into another warehouse, badly damaging the building; and the fourth boiler was entirely torn to pieces. The loss is estimated at from \$12,000 to \$15,000. The nail and plate mill was but slightly damaged. Operations in these departments can be resumed in a week or ten days. No cause can be assigned for the accident.

Bids for the East River Bridge Superstructure.—It was stated last evening at the office of the Brooklyn Bridge Company that no contract had yet been awarded on the bids for ironwork of the superstructure opened a few days ago. No. 1, New Jersey Steel and Iron Company, 17 Burling Slip, N. Y.; No. 2, Edgemoor Iron Company, Wilmington, Del.; No. 3, Kingston Bridge Company, Pittsburgh, Pa.; No. 4, Clark Reeve & Co., 410 Walnut street, Philadelphia; No. 5, Leighton Bridge Company, Rochester, N. Y. The award will probably be made at the meeting of the executive committee on Monday next.

Burning of the New York Flow Co.'s Works.—The entire works of the New York Flow Company, at Newark, together with the machinery, were destroyed by fire on the 23d inst. The loss is estimated at \$100,000; insurance, \$50,000. The company in a circular state that most of their patterns, the accumulation of 50 years, were in a fire-proof building and are not injured. As there are many goods on hand the interruption of business will be slight. Reconstruction will begin at once with improved machinery. Plans for the future will be definitely known to-day.

The Sheffield correspondent of The Engineer tells the following queer story as to the ways of local workmen: A leading manufacturer, suspecting that there was a waste of power in his establishment, came down to his works one morning at the unexpected hour of 7.30. His great "wheel," which supplies power to all his grinders, begins to revolve in time for the men to commence work at eight. At eight o'clock there was nobody there. Fifteen minutes later one or two strolled in; at 8.30 a few more; and they continued to come in, in twos and threes, at 8.45, 9, 9.15, 9.30, 10, 10.30, and 11 o'clock. He was annoyed. The loss of power was to him a very serious consideration. He put up a notice that in the future the wheel would not furnish power till three-fourths of the men were in attendance. Did the notice bring them all to the place at 8? Not a bit of it. The men looked at the notice, quietly put their coats on again, and walked out of the place!

HOBART'S TACKS

MANUFACTURED BY
DUNBAR, HOBART & WHIDDEN,
ESTABLISHED 1810.

Office and Salesroom, 116 Chambers Street, New York. . . . Factory, South Abington, Mass.

FRENCH WIRE NAILS, ESCUTCHEON PINS, MOULDING, PULLEY NAILS, &c.
With Round, Flat, and Fancy Heads.

ROUND HEAD, COUNTERSUNK AND MOULDING NAILS.	Escutcheon Pins.	Brass Wire Nails.
1/2 in. 17	2-8 2 1/2 3/4 4-8 3/4 6-8 3/4 1 in. 18	3-8 in. 22
3/4 in. 16	No. 18.	3/4 in. 21
1 1/4 in. 15	No. 19.	4-8 in. 20
1 3/4 in. 14	No. 16.	5-8 in. 19
2 in. 13		6-8 in. 18
2 1/4 in. 12		7-8 in. 17
2 3/4 in. 11		8-8 in. 16
3 in. 10		9-8 in. 15
		10-8 in. 14
		11-8 in. 13
		12-8 in. 12
		13-8 in. 11
		14-8 in. 10
		15-8 in. 9
		16-8 in. 8
		17-8 in. 7
		18-8 in. 6
		19-8 in. 5
		20-8 in. 4
		21-8 in. 3
		22-8 in. 2
		23-8 in. 1
		24-8 in. 0

Any Kind of Wire Nails made to order from Description, or Samples.

American and Swedes Iron Tacks,

Tinned, Leathered and Large Head Carpet Tacks, Finishing Nails, Black and Tinned Trunk Nails, Miners' Copper, Gimp, Lace and Brush Tacks, Hungarian, Chair, Cigar Box and Barrel Nails, Glaziers' Points, Iron, Steel, Copper and Zinc Shoe Nails, Patent Improved Brass Shoe Nails, Heel and Toe Plates, Steel Shanks, and Fancy Head Nails, Silver or Japanned Lining and Saddle Nails, A full assortment always on hand at salesrooms, for immediate delivery if required. Odd and Irregular Sizes made to order or cut from sample at short notice. Send for Price List.

THE LANGDON MITRE BOX COMPANY,

Millers

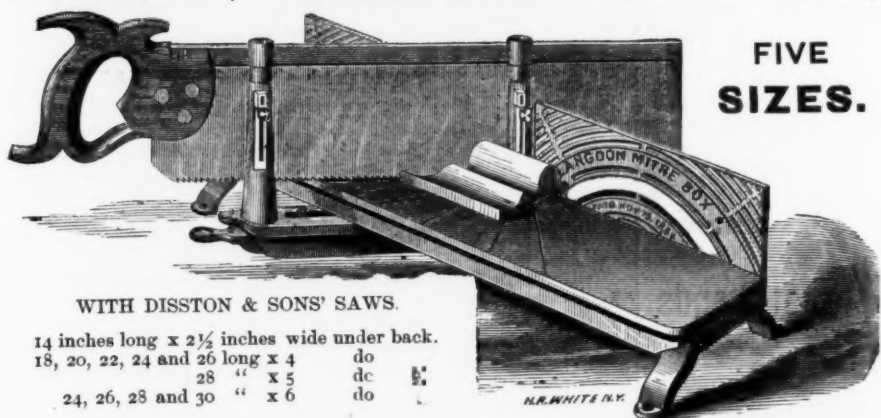


Falls, Mass.,

Sole Owners and Manufacturers of the

LANGDON ADJUSTABLE MITRE BOX,

FIVE SIZES.



WITH DISSTON & SONS' SAWS.

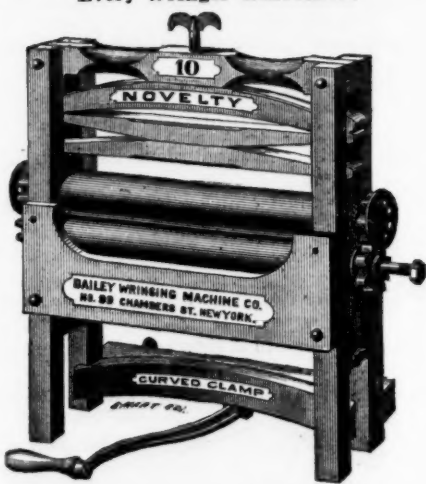
14 inches long x 2 1/2 inches wide under back.
18, 20, 22, 24 and 26 long x 4 do
28 " x 5 do
24, 26, 28 and 30 " x 6 do

Five sizes of Mitre Boxes. Eleven sizes of Saws. Dealers wishing to advertise furnished with electrotypes without cost.

THE NOVELTY WRINGER.

Every Wringer Warranted.

Saves more than its cost every year in the saving of the clothes alone.



For Wholesale Prices of Novelty Wringers see New York Price Current Page.

MANUFACTURED BY

BAILEY WRINGING MACHINE CO.,
No. 99 Chambers Street, New York. E. J.

ALSO MANUFACTURERS' AGENTS FOR

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SPECIAL QUOTATIONS ON THE ABOVE GOODS FOR EXPORT.

G. W. Bradley's Edge Tools.

Butchers' Cleavers,
Butchers' Choppers,
Axes and Hatchets,
Grub Hoe and Mattocks,
FBI Picks,
Box Chisels and Scrapers

Ring Bush Hooks,
Axe Eye Bush Hooks,
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Wait's Ship Carpenters' Tools,
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Coopers' and Turf-cutting Tools.

FOR SALE BY

MARTIN DOSCHER, Agent, 96 Chambers Street, N. Y.

NATIONAL Horse Nail Co.

MANUFACTURERS OF

FINISHED
(BRIGHT OR BLUED)



These nails are made of the best brands of NORWAY IRON, and are guaranteed to be equal to any in the market.

NATIONAL HORSE NAIL CO.,
VERGENNES, VT.

HORACE DURRIE & CO., Agents,
No. 97 Chambers St., New York



Eastern Agency

FOR

BARNES'

Foot Power Scroll & Circular Saws, Lathes,

Mortising Machines, Saw Blades, &c.

CHAS. E. LITTLE, 59 Fulton St., N. Y.
Hardware Specialties. Send for Lists.

TACKLE BLOCKS

BURR & CO.,

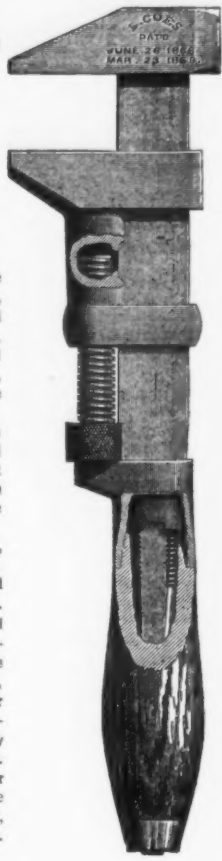
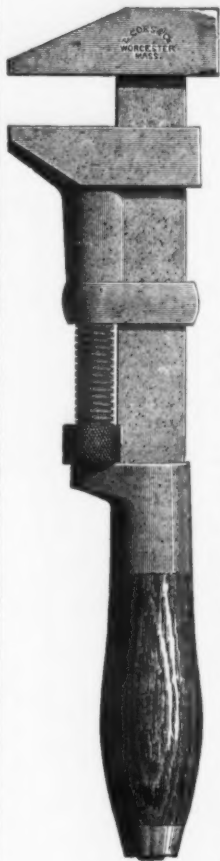
Manufacturers of Waterman and Russell's Patent Iron Strapped Blocks. Also, Manufacturers of ROPE STRAPPED BLOCKS. 31 Peck Slip, New York.

L. COES' SCREW WRENCHES.

Genuine Improved Patent

Manufactured by

L. COES & CO.,
Worcester, Mass.



We invite the particular attention of the trade to our New Straight Bar Wrench, widened, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to any strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the fact, that in 1869 we made several important improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were at once closely imitated and sold as the Genuine Wrench by certain parties who seem to rely upon our improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be good evidence that we manufacture a superior Wrench, we wish the trade may not be deceived on the question of originality. Trusting the trade will fully appreciate our recent efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped!

"L. COES & CO."

Warehouse, 97 Chambers St., & 81 Reade St., N. Y.
HORACE DURRIE & CO., Sole Agents.

M. H. JONES & CO.
BEST CUT-STEEL AXES
AND EDGE TOOLS.
HORACE DURRIE & CO. Agents, New York.



ESTABLISHED 1850.
WM. HASSALL,
Manufacturer of
American and French
Wire Nails

With Flat, Round, Oval, Depressed, Screw and Fancy Heads.

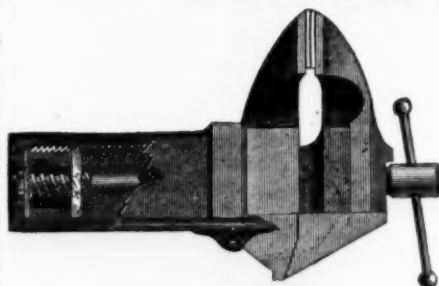
Molding and Finishing Nails, with or without heads. Brush Makers', Upholsterers', Cigar Box, Basket, Chair and Undertakers' Finishing Nails a specialty. Shoe Nails of Brass and Iron. Bright Iron Rivets, Brass and Iron Escutcheon Pins, with flat, round and fancy heads, all sizes on hand and to order.

OFFICE AND WORKS: Nos. 63 & 65 Elizabeth Street, New York.

"TRENTON" RAPID TRANSIT VISES.

Pat. Nov. 1st, 1870; Feb. 12th, 1877.

PARALLEL
Swivel and Coachmakers' VISES.



The Best Rapid Adjustable Vise in the Market.

Simple and durable. No chance of getting out of order. No toggle or cam movements or parts. A trial will convince.

MANUFACTURED BY THE
TRENTON VISE & TOOL WORKS, Trenton, N. J.

Address orders to
HERMANN BOKER & CO., Proprietors,
101 & 103 Duane Street, NEW YORK.

CHAMPION HOG RINGER RINGS AND HOLDER.

Only double Ring ever invented. The only Ring that will effectively keep Hogs from rooting. No sharp points in the nose. Use no other.



BROWN'S HOG AND PIG RINGER and RINGS. Only single Ring in the market that closes on the outside of the nose. No sharp points in the nose to keep it sore.

Ringers, 75c. Rings, 50c, 100c. Holders, 75c. Huskers, 10c.
CHAMBERS BERING & QUINN, Exclusive Manufacturers, Decatur, Ill.

What an Earthquake is Like.

A correspondent writing to a friend in Montreal from Caracas, May 2, gives the following additional interesting details of the late earthquake shocks:

We had on the 12th April, about 8.40 p. m., about as lively a shake as I want to experience. I first heard a loud, rumbling noise, and then it seemed a 1000-ton engine was rushing over the pavements, and then a scream like a hundred engines run mad, and then the house began to shake and the floor began to rise up, and about that time I was out in the open yard. There were a few risings in the floor of the yard, and all was over so far as Caracas was concerned. A few pictures and mirrors fell to the ground in some of the houses. In the cathedral an image or two fell down—and nothing more. But the town of Cua—about twelve miles from here, a beautiful and flourishing place, was by the same shock entirely destroyed and from 300 to 400 lives lost. Our President has sent money, provisions and troops to the place, and has done everything possible to alleviate the sufferings of the people. His wife, "Nina Belen," and family rushed into the plaza and had tents put up, and for many days slept therein. Thou sands of people left town that day; in fact, all that could; the rest slept in the plaza, some in tents and on cots, but the majority on the benches and on the sidewalks, and for a few days the appearance of the city was really ludicrous—every park, square, wide street or open space was filled with tents, and the middle of the streets with soldiers under arms. Mosqueria's coffee yard, the one you visited while here, was filled with people—100 to 150—sleeping there nightly for a week or more, some on the bare ground and some under tents, and the tents were wonderful to behold, both there and in town. Tents, shanties, gypsy encampments, tents of canvas, white, striped and speckled, of calico, of coffee bags, of old sheets and of paper—anything answered. Finally things became more quiet. We had daily shocks, but light ones; people began to sleep in their houses. Holy Week came on and church processions also. In one procession a woman became alarmed and screamed, and immediately a stampede began to the cry of "Temblor," and then women and children were crushed and injured by being trampled upon and one woman killed, but there was no Temblor. The President issued an order stopping processions and closing the churches until Easter, and on Sunday, the 28th, at 8.30 o'clock, while the fashionable church of Alta Gracia, just above my house, was filled to the utmost, came another severe shock and stampede. Women with long trains fell and were trampled on and hurt, and among the men were thieves, who wrenched off ear-rings, bracelets, chains, &c. And that was all for Caracas. Not so, however, with the town of Ocumare, about the same distance from here as the ill-fated Cua. Ocumare had the best part of the town destroyed, viz., all the fine houses, while the cottages of the poor were saved.

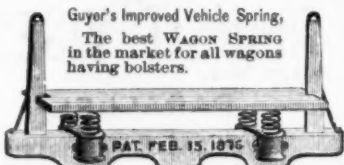
THE VICTOR PLANES

Are the Best.



No. 10½, Circular Plane, Price, \$4.50 each. The above cut represents L. Bailey's Patent Plane designed for Circular work, either concave or convex. It works on a straight line or in any degree of curve down to thirteen inches in diameter. Both ends are moved simultaneously with one hand and instantly secured at any desired degree of curve without resort to the slow manipulations of a fine threaded screw in making the changes. If desired the connecting plate may be detached, when the ends will act independently and can be adjusted to different curves, as is sometimes necessary on special work, such as Stair Rails, &c. Every part is strong, simple, compact and at home. It has no competitor in practical utility. We manufacture L. Bailey's Circular, PATENT ADJUSTABLE STANDARD TOOLS, comprising a list of nearly fifty different sizes and styles of VICTOR IRON PLANES, SOCKET CHAVES, BOX CHAVES, TAY SQUARES, FLUTE T BEVELS, &c., adapted to every description of mechanical use. Amateurs will find their wants fully met in our list of Tools. On receipt of list price we will send to any address in the United States, by mail, postage paid, any tool found in our list excepting Nos. 5, 6, 7 and 8, which being too heavy will be expressed on same conditions. Always order by list number. Send for Illustrated Price List. Address

LEONARD BAILEY & CO.,
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DEERE, MANSUR & CO., St. Louis, Mo.
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GEO. W. & S. TAYLOR, Smyrna, Del.
E. P. SPIKER, Piqua, Ohio.
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THE LAFAYETTE WAGON SPRING CO.,
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HUGH W. ADAMS,

56 Pine Street, New York City.

Eureka Iron Co.'s Boiler Plate Iron,
Com. Tank to Best Fire Box.

PALO ALTO IRON WORKS

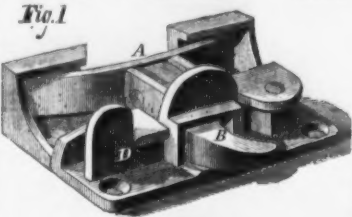
11, 16, 18, 20 22, 28 & 30 lb. T Rails.

WROUGHT IRON BEAMS,

4 in to 12 in.

Anthracite and Charcoal Pig Iron.

THE PERFECT SASH TIGHTENER AND LOCK.



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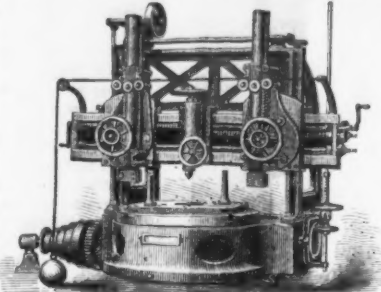
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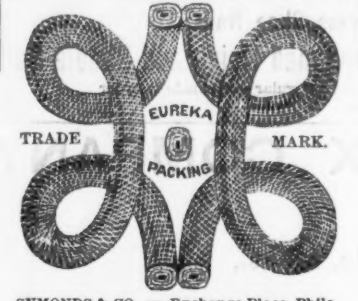
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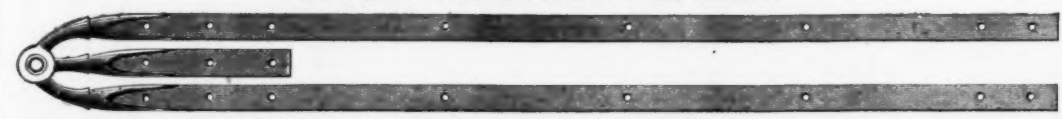
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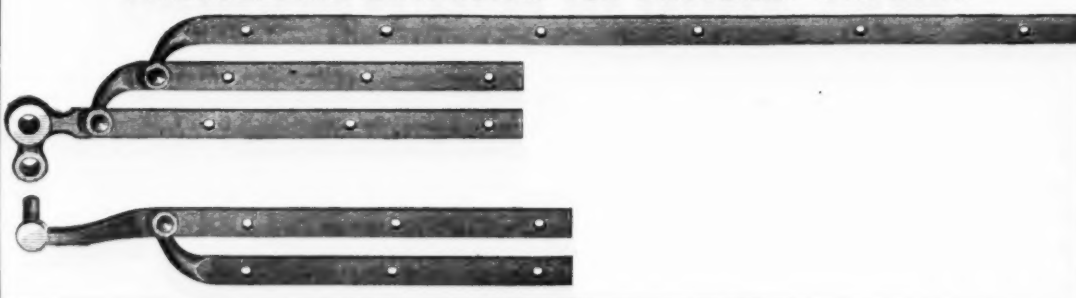
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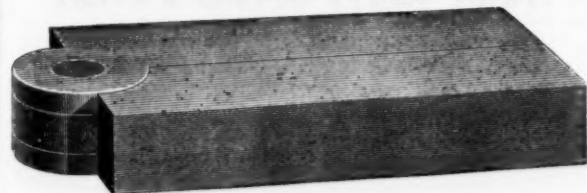
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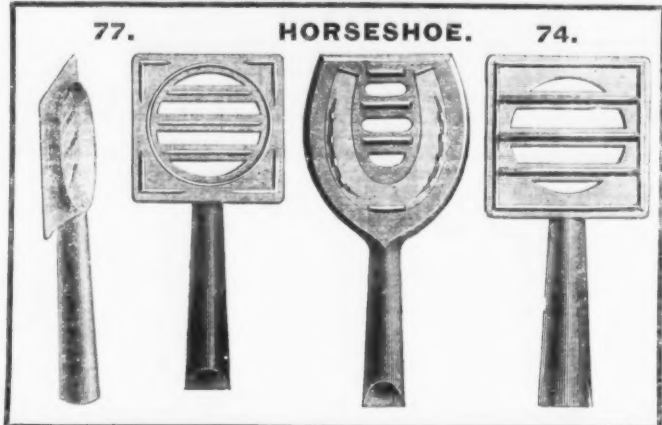
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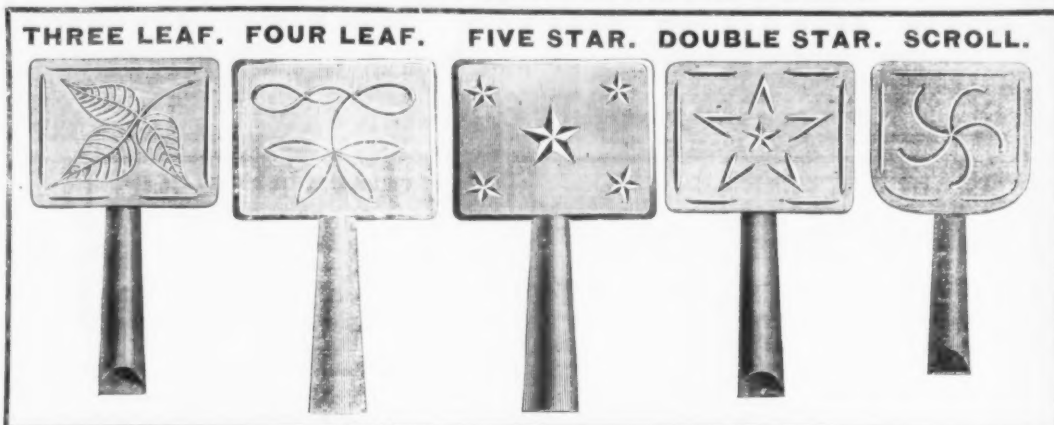
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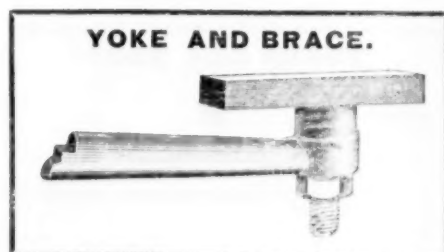
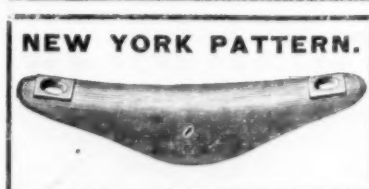
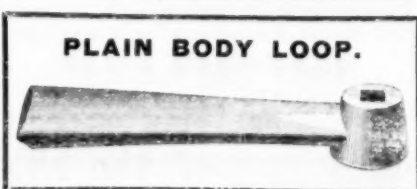
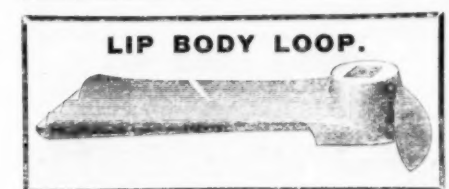
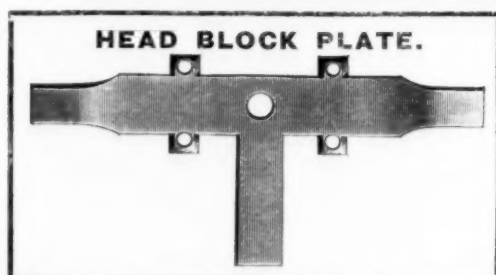
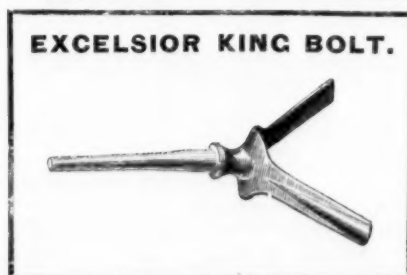
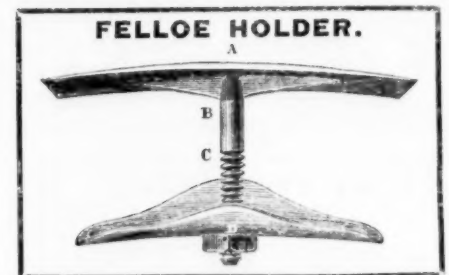
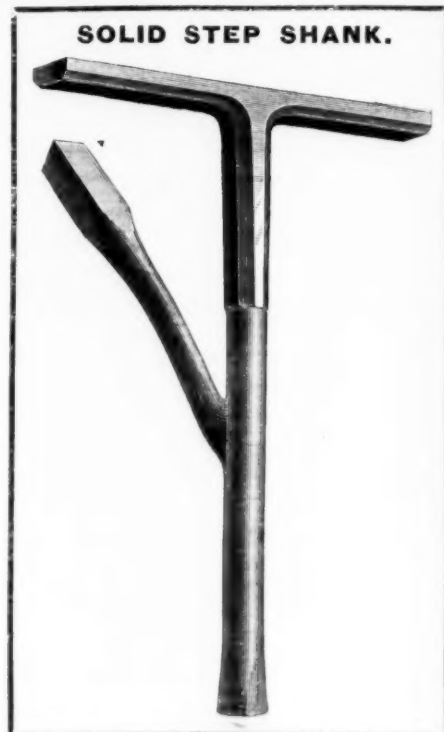
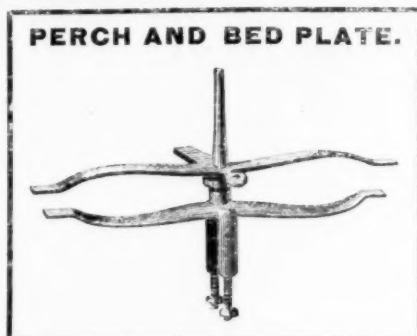
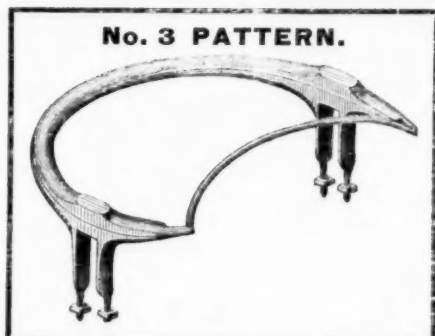
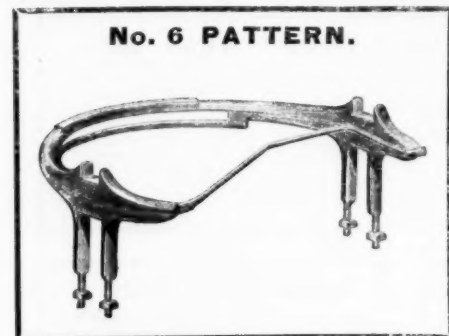
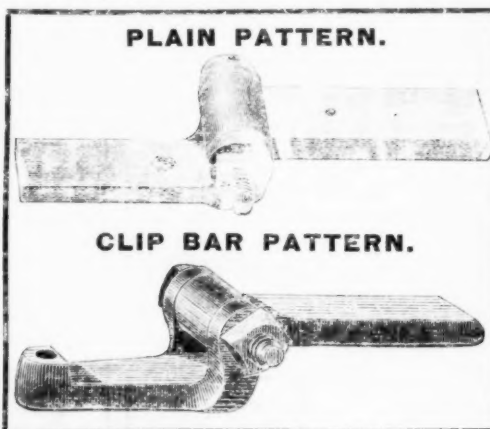
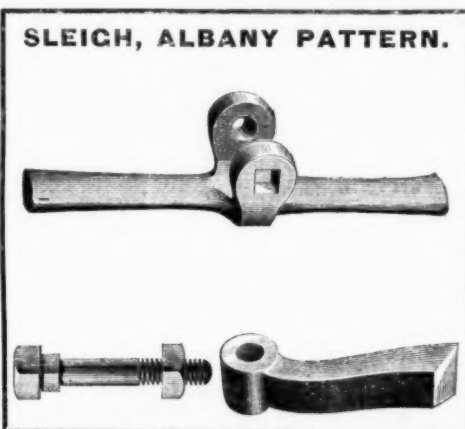
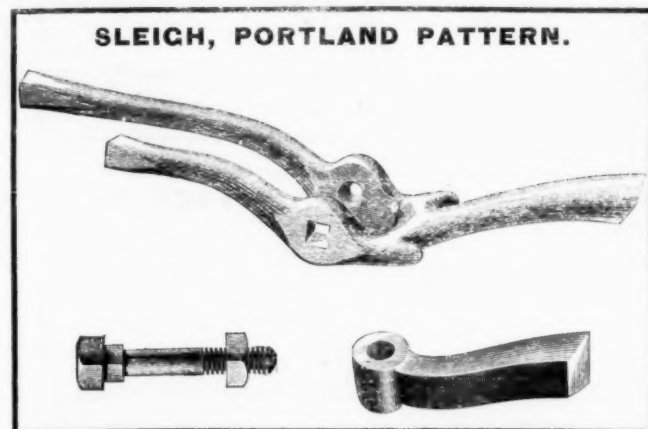
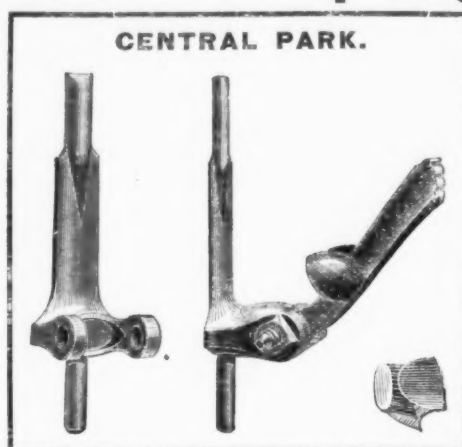
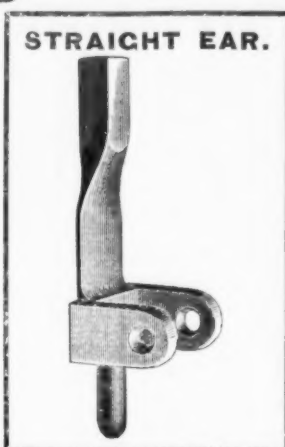
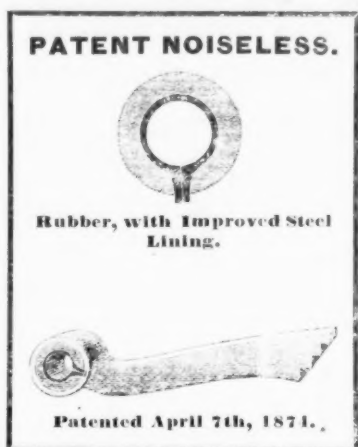
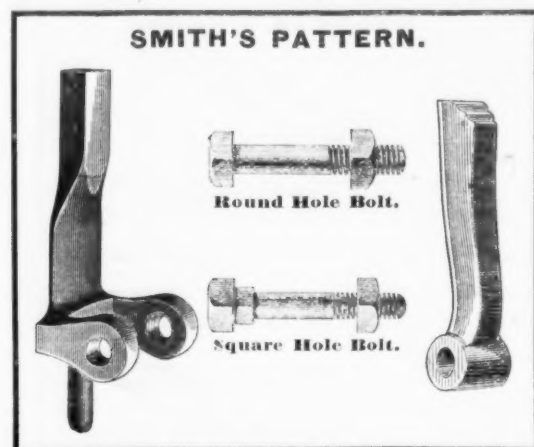
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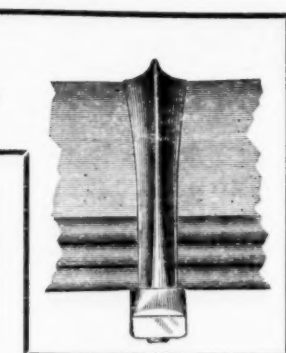
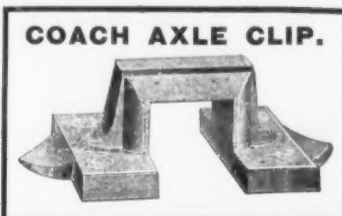
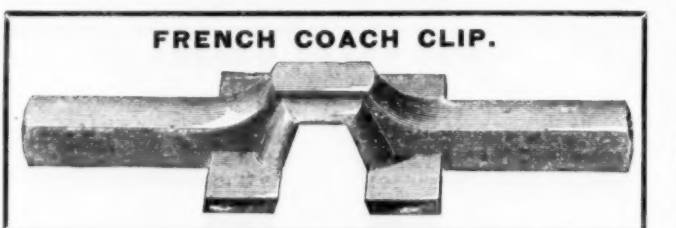
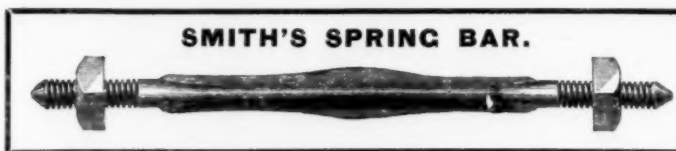
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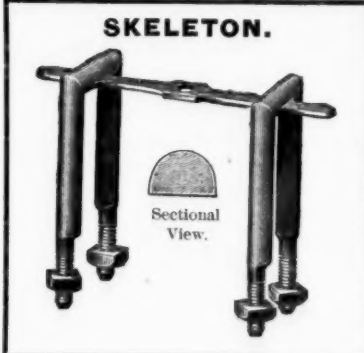
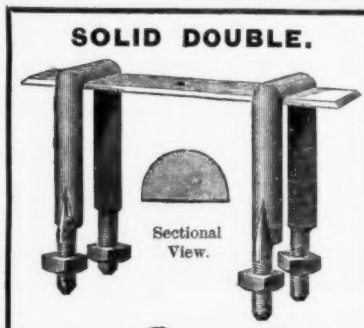
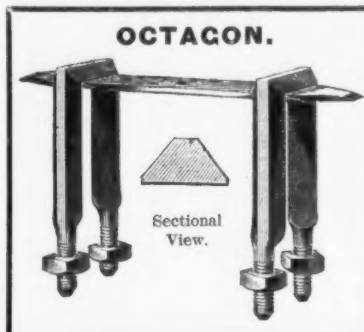
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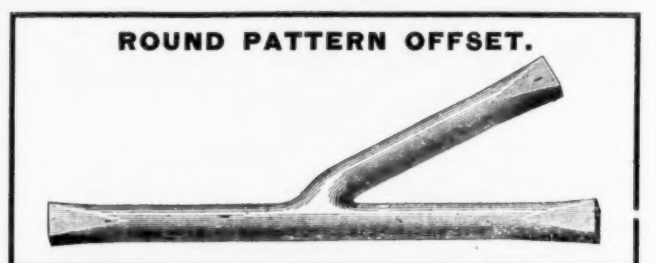
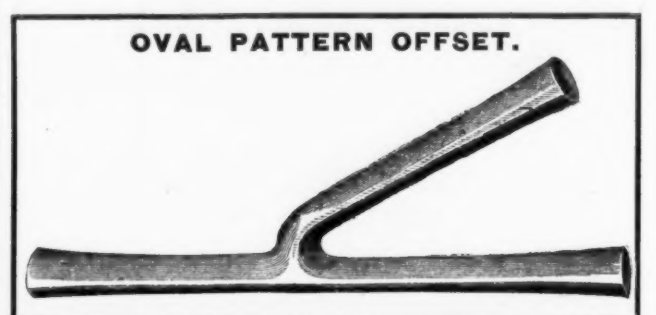
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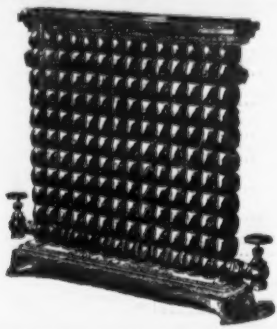
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Faucets, Self-Measuring, Makers of.	
Enterprise Mfg. Co., Phila., Phila. and N. Y.	38
Felt and Wadding.	
Bacon Chas. N., Winchester, Mass.	19
Files, Importers of.	
Carr J. & Riley, 82 John, N. Y.	36
Johnson Joseph S., 41 Commerce, Phila.	36
Fraser Peter, 100 Chambers, N. Y.	36
Moss F. W., 50 John, N. Y.	36
Sanders Bros. & Co., 16 Cliff, N. Y.	36
Files, Manufacturers of.	
American File Co., Pawtucket, R. I.	8
Auburn File Works, 80 Chambers, N. Y.	8
Burnett, Murray & 45 Richmond, Phila.	8
Chalmers & Murray, 45 Richmond, Phila.	8
Diston Henry & Sons, Phila., N. Y.	33
Draper C. & Co., Sing Sing, N. Y.	33
Everhart James J., New York, N. Y.	44
Heller & Bros., Newark, N. J.	44
Johnson & Bro., 1 Commercial, Newark, N. J.	44
McCaffrey & Bro., 120 Chambers, N. Y.	44
Paul Chas. B., Williamsburgh, N. Y.	44
Fire Brick, Makers of.	
Borgess & Co., Philadelphia, Pa.	19
Brooklyn Clay Retort or Fire Brick Works, Van Dyke St., Brooklyn, N. Y.	19
Knickerbocker Brick Co., Newburgh, N. Y.	19
Hall A. & Sons, Perth Amboy, N. J.	19
Hall & Sons, Buffalo, N. Y.	19
Kreuer Henry, 145 East 23d, N. Y.	19
Newton & Co., Albany, N. Y.	19
Oranston James, 100 Chambers, N. Y.	19
Valentine & Sons, Bridgeport, Conn.	19
Watson John R., Perth Amboy, N. J.	19
Weber Adam, 63 E. 15th, N. Y.	19
Flint and Emery Paper and Cloth.	
Baeder, Adamson & Co., 22 Market, Phila.	19
Flower Pot Stands.	
Barum E. T., Detroit, Mich.	26
Fluting Machines.	
The American Fluting Co., Philadelphia.	32
Weeks A. A., 82 John, N. Y.	32
Forges, Portable, &c.	
Keystone Portable Forge Co., Philadelphia.	40
Fossiliferous Ores.	
Brown J. S., 25 Chambers, Tenn.	6
Foundry Facings.	
Faxson J. W. & Co., 514 Beach, Phila.	5
Whitehead Bros., 157 W. 15th, N. Y.	5
Richmond & Potter, 119 S. Fourth, Phila.	5
Furniture Springs.	
Carey & Moon, 234 W. 20th, N. Y.	3
Hatch John F., 81 John, N. Y.	3
Galvanized Iron.	
Lefferts Marshall, Jr., 50 Beekman, N. Y.	4
Grain Cradles.	
Grant Fan Mill and Cradle Co., Melrose, Rensselaer Co., N. Y.	44
Grindstones.	
Cooper & Hollis, Brooklyn, N. Y.	37
Wilson & Hughes Stone Co., Cleveland, O.	37
Wood H. & Sons, 100 Chambers, N. Y.	37
Wood Walter R., 283 and 285 Front, N. Y.	37
Worthington & Sons, North Amherst, O.	37
Guns, &c.	
Windmiller Louis & Roelker, 70 Beade, N. Y.	26
Gunpowder, Makers of.	
Kneeland F. L. (DuPont) 70 Wall, N. Y.	36
Lafin & Rand Powder Co., 26 Murray, N. Y.	36
Hardware, Commission Merchants.	
Black & Phillips, 100 Chambers, N. Y.	9
Graham & Haines, 113 Chambers, N. Y.	9
Salomont L., 100 Chambers, N. Y.	11
Salomont L., 100 Chambers, N. Y.	11
Tennis & Wilson, 81 Beekman, N. Y.	12
Walbridge G. B. & Co., 83 Beade, N. Y.	12
Hardware, Dealers.	
Brooklyn Hardware Co., 288 Greenwich, N. Y.	31
Lloyd, Supple & Walton, 625 Market, Phila.	31
Shepard Sidney & Co., Buffalo, N. Y.	35
Hardware, Importers.	
Baker Hermann & Co., Duane, N. Y.	37
King, Briggs & Co., 596 Broadway, N. Y.	11
Van Wart, 100 Chambers, N. Y.	11
Windmiller Louis & Roelker, 70 Beade, N. Y.	11
Hardware, Manufacturers.	
American Spiral Spring Butt Co., 82 Beekman, N. Y.	44
Black & Phillips, 100 Chambers, N. Y.	44
Coulter, Flazler & Co., 93 Chambers, N. Y.	44
Cowles Hardware Co., Unionville, Conn.	44
Enterprise Mfg. Co., 100 Chambers, N. Y.	44
Hart, Bliven & Mead Mfg. Co., Phila., N. Y.	44
Lloyd, Supple & Walton, 625 Market St., Phila.	37
Russell & Sons, 120 Greenwich, N. Y.	37
Shepard Hardware Co., Buffalo, N. Y.	35
Stanley Works, New Britain, Conn.	44
Union Mfg. Co., 98 Chambers, N. Y.	44
Van Wagner & Williams, 82 Beekman, N. Y.	44
Hardware Specialties.	
Shepard Sidney & Co., Buffalo, N. Y.	35
Shepard Sidney & Co., 94 Chambers, N. Y.	36
Hardware (Wagon).	
Covert E. & J. C., Farmer Village, N. Y.	13
Harness Snaps.	
Covert Mfg. Co., Troy, N. Y.	13
Hay Knives.	
Holt Hiram & Co., East Wilton, Me.	6
Hinges.	
Lewis, Oliver & Phillips, Pittsburgh, Pa.	13
Seavill Mfg. Co., 419 and 421 Broome, N. Y.	13
Stanley Works, New Britain, Conn.	12
Hog Ringers.	
Chambers, Boring & Quinlan, Decatur, Ill.	25
Hoisting Engines, Makers of.	
Crane Bros. Mfg. Co., Chicago, Ill.	9
Mundy J. S., Newark, N. J.	9
Hoisting Machines.	
Harrington Edwin & Son, Philadelphia, Pa.	44
Cham, Volney W. & Co., Providence, R. I.	44
Horse Nails, Makers of.	
Ausable Horse Nail Co., 4 Warren, N. Y.	8
Cham & Sons, 100 Chambers, N. Y.	8
Globe Nail Co., Boston, Mass.	41
TP Horse Nail Co., Cleveland, O.	41
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Northwestern Horse Nail Co., Chicago, Ill.	41
Plant & Co., Buffalo, N. Y.	41
Stinson Saml. & Co., Newark, N. J.	41
Stetson N. Jr., 72 Pearl, N. Y.	41
Horse Shoes, Makers of.	
Rhode Rolling Mills, 17 Battery March, Boston.	5
Rhode Island Horse Shoe Co., Providence, R. I.	4
Schoenberger & Co., Pittsburgh, Pa.	4
Hydrants, &c.	
McLean John & Monroe, N. Y.	39
Hydraulic Jacks.	
Dudgeon Richard, 24 Columbia, N. Y.	40
Insurance, Boiler.	
Hartford Steam Boiler Inspection & Insurance Co.	40
Iron Brokers.	
Abel Brothers, 190 South, N. Y.	4
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Warner B. & Co., 120 Greenwich, N. Y.	4
Williamson James & Co., 59 Wall, N. Y.	4
Whitney A. R. & Bro., 58 Hudson, N. Y.	4
Iron, (Manufacturers Agents).	
Pay & Kimball, Philadelphia, Pa.	4
Iron, Manufacturers of.	
Boston Rolling Mills, 17 Battery March, Boston	5
Bradley Rees & Co., 22 Cliff, N. Y.	5
Burden Wm. & Co., Pittsburgh, Pa.	5
Collins H. E. & Co., Pittsburgh, Pa.	5
Houdette & Ellis, Boston, Mass.	5
Kirkpatrick & Co., Pittsburgh, Pa.	

Ironware (Granite).	
St. Louis Stamping Co., St. Louis, Mo.	6
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Massie Furnace Co., Boston, Mass.	6
Lathe, Manufacturers of.	
Dietz R. F. (Tubular) 54 and 56 Fulton, N. Y.	44
Ward & Morse, 45 Fulton, N. Y.	44
Laths.	
North Selden G. Philadelphia.	6
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Johnson, Jr., Israel H. & Co., Philadelphia.	42
Shepard & Co., Cincinnati, O.	42
Lawn Mowers.	
Mast, Foss & Co., Springfield, O.	26
Lead Pipe, &c., Manufacturers of.	
Bayley, Farrell & Co., Pittsburgh, Pa.	2
Levers.	
Diston Henry & Sons, Philadelphia.	33
Locks, Manufacturers of.	
Bohannon Wilson, Broadway and Kossuth, Brook-	38
lyn, N. Y.	38
D. H. Miller Lock Co., Philadelphia, Pa.	38
Ford Hyatt Jr., 733 Broadway, N. Y.	38
Smith & Egan, Newark, N. Y.	38
Smith & Egan, Mfg. Co., Hridenport, Conn.	38
Stewart & Mattson, Philadelphia, Pa.	37
Union Nut Co., 35 Chambers, N. Y.	26
Yale Lock Mfg. Co., 35 Chambers, N. Y.	26
Machinery, Makers of.	
Bliss & Williams, 179 Plymouth, Brooklyn.	43
Brooklyn Iron Works, 179 Plymouth, Brooklyn.	43
Pittsburgh Mfg. Co., Pittsburgh, Pa.	42
Pratt & Whitney Co., Hartford, Conn.	42
Reid & Co., 1550 Main, Penn. Phila.	42
The Bulling Machine Co., 43 Dev., N. Y.	42
Wetherell Robert & Co., Chester, Pa.	42
Machine Screws, Makers of.	
W. Williamsburg, N. Y.	42
Machinists' Tools, Makers of.	
Blaisdell P. & Co., Worcester, Mass.	36
Davis A. J. & Co., Newark, N. J.	43
Fraser & Co., 43 Chatham, N. Y.	43
Malleable Iron Castings, Makers of.	
Hammer & Co., Branford, Conn.	3
Mallets.	
New Handle and Mallet Works, 45 E. Houston.	38
Manganese.	
Pyrolutite Manganese Co., 214 Pearl, N. Y.	37
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Murray Iron Works, Burlington, Iowa.	8
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Crane O. O., 134 John, N. Y.	4
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Nails.	
Chester Mills & Porcelain Co., 87 Liberty, N. Y.	38
Miners' Candles, Makers of.	
Knolly Geo. & Co., 214 Franklin, N. Y.	42
Mineral Lands, Dealer in.	
Hoskins W. A., Chattanooga, Tenn.	6
Mineral Wool.	
Elbers Alexander D., 204 Broadway, N. Y.	5
Models.	
Burrows Wm., 90 Fulton, N. Y.	42
Everhard Geo. F. & Co., Canton, O.	42
Mouse Traps.	
Bliss R. E., 34 and 36 Fulton, N. Y.	4
Oliver E. C. & Co., 121 Beekman, N. Y.	43
Ripley Mfg. Co., Unionville, Conn.	42
Moving Machine Knife Grinder.	
Henry Henry, Canton, O.	12
Nails.	
Schoenberger & Co., Pittsburgh, Pa.	4
Zug & Co., Pittsburgh, Pa.	4
Nail Machinery.	
Coryell & Hall, Pittsburgh, Pa.	4
Nickel Platers.	
Hartman John, 374 N. Seventh, Philadelphia.	41
Jackson Geo. W., 21 E. 11th, N. Y.	41
Nickel Platers, Supplies.	
Coll A. T., 206 Beekman, N. Y.	41
Condit, Hanson & Van Winkle, Newark, N. J.	41
Zucker & Levett, 639 and 61 W. 51st, N. Y.	31
Night Lathes.	
Francis, 413 Chambers, N. Y.	8
Norway Shapes, Rollers of.	
Rowland Wm. & Harvey, Hartford, Philadelphia.	44
Note Broker.	
Gallauch E. W., 3 and 5 Wall, N. Y.	4
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Nuts, Bolts, etc., Manufacturers of.	
Fuller Bros. & Co., 135 Greenwich, N. Y.	4
Madachy H. H. & Co., Pawtucket, R. I.	4
Lewis, Oliver & Phillips, Pittsburgh, Pa.	37
Rosberry, Geo. D., 100 Market, Port Chester, N. Y.	4
Shelton Co., Birmingham, Conn.	44
Standard Nut Co., Pittsburgh, Pa.	6
Union Nut Co., 98 Chambers, N. Y.	44
Oil Lubricating, Makers of.	
Lester Oil Co., 31 Maiden Lane, N. Y.	43
Oil Stones.	
Boyd & Chase, 107th and Harlem River, N. Y.	37
Oil Stoves.	
Florence Machine Co., Florence, Mass.	44
Fuller Bros. & Co., 3 Park Place, N. Y.	44
Pool Geo. & Sons, 70 and 72 Fulton, Brooklyn, N. Y.	38
Old Iron, etc.	
Gregg H. L. & Co., 103 Walnut, Philadelphia.	42
Paints and Varnishes.	
"Empire Packing," Canfield Mfg. Co., Philadelphia.	42
Symonds F. & Co., Philadelphia.	25
Devoy F. W. & Co., 119 Fulton, N. Y.	4
Pans (Dripping and Bread).	
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Patent Solicitors.	
Hawson & Son, Phila., and Washington, D. C.	2
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Perry & Co., Limited, 121 and 114 William, N. Y.	26
Picks, Makers of.	
Carton & Co., 40 Broadway, N. Y.	2
Picks, Fittings, etc., Makers of.	
Eaton, Cole & Burnham Co., 28 John, N. Y.	32
Farrell & Hartley, Scranton, Pa.	32
Pancost & Maule, 27 Fear, Philadelphia.	32
Pipe, Water and Cast, Makers of.	
Perkins Archibald, Philadelphia.	6
Wood R. D. & Co., 405 Chestnut, Philadelphia.	32
Plane Irons, Manufacturers of.	
Fuller Bros. & Co., Buffalo, N. Y.	12
D. R. Barton Tool Co., Rochester, N. Y.	12
Planes, Manufacturers of.	
Lea & Leonard, 100 Prattford, Conn.	26
Bailey Wringing Machine Co., 98 Chambers, N. Y.	25
D. R. Barton Tool Co., Rochester, N. Y.	12
Fuller Bros. & Co., 135 Chambers, N. Y.	12
Plated Ware.	
Hall, Elton & Co., 75 Chambers, N. Y.	11
Plaster.	
Hagator & Thorpe, Ledger Building, Philadelphia.	11
Plumbers' Materials, Manufacturers of.	
Harmon Jas. & Son, Scranton, Pa.	23
Carr Wm. S. & Co., 105 Center, N. Y.	23
Pocket Knives.	
Thorne G. L. & Co., 11 Duane, N. Y.	11
Portable Cooker.	
Thorne G. L. & Co., 15 Warren, N. Y.	43
Bliss & Williams, 179 Plymouth, Brooklyn.	43
Merriman A. H., West Meriden, Conn.	43
Keystone Portable Forge Co., Middletown, Conn.	43
Pressure Blowers, Makers of.	
Keystone Portable Forge Co., Philadelphia.	40
Printers.	
Graphic Printing Co., 95 Chambers, N. Y.	19
Pulleys, Friction.	
Worcester & Co., Providence, R. I.	41
Penfield Block Works, Lockport, N. Y.	41
Providence Tool Co., Providence, R. I.	41
Pump Pumps.	
Burrows Wm. & Co., Philadelphia.	43
Pumps, Makers of.	
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Rails, Iron or Steel, Makers of.	
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Revolving Scraper Co., Columbus, Ohio.	3
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Hoopes & Toole, Philadelphia.	38
Hoopes & Toole, Rivet Works, Kingston, Mass.	38
Townsend W. P. & Co., Pittsburgh, Pa.	38
Road Scrapers.	
Bliss & Williams, 179 Plymouth, Brooklyn.	6
Rolling Mill Machinery, etc., Manufacturers of.	
Boore, James, cor. 16th and Buttonwood, Phila.	43
Stanley Lead and Level Co., 35 Chambers, N. Y.	11
Stephens & Co., Riverton, Conn.	11
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American Machine Co., Philadelphia.	37
Enterprise Mfg. Co., Philadelphia.	37
Saw and Edge Paper, Makers of.	
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Saw Trenches.	
Bliss & Williams, 179 Greenwich, N. Y.	37

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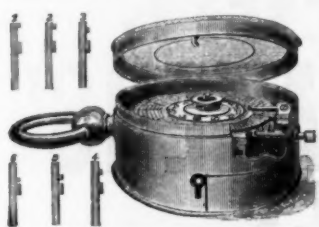
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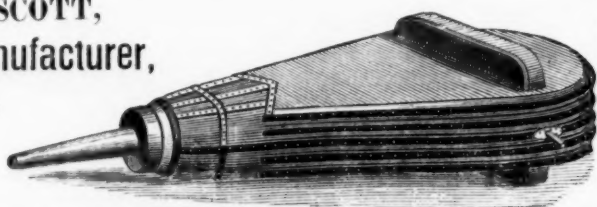
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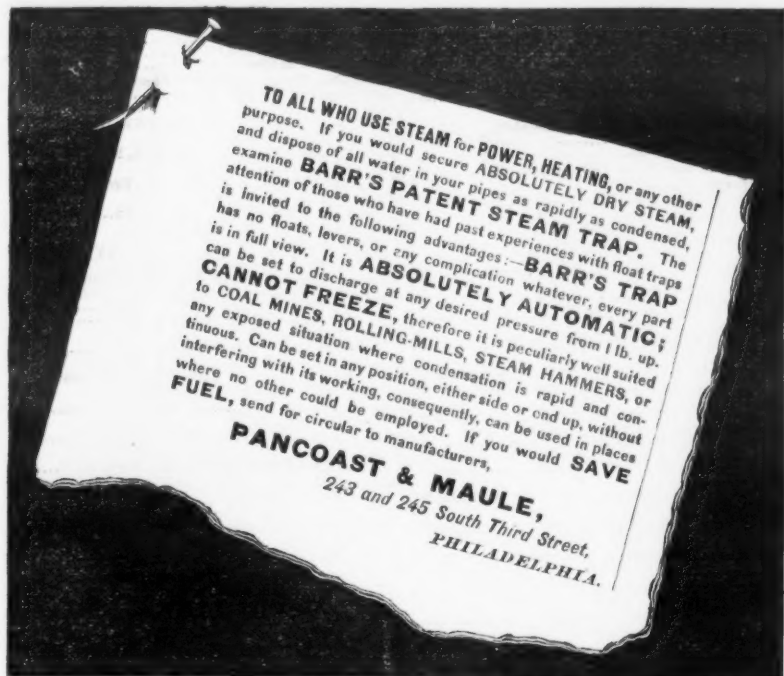
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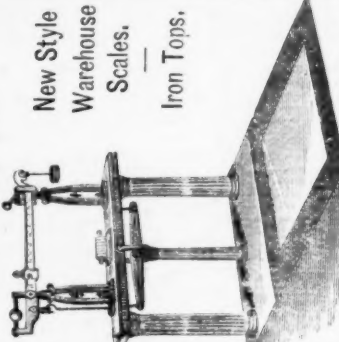
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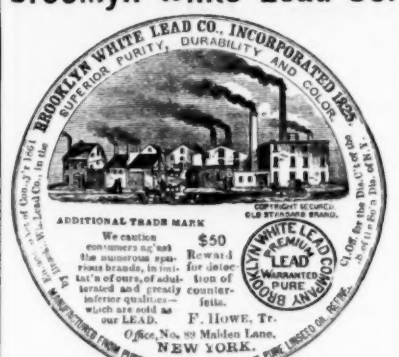


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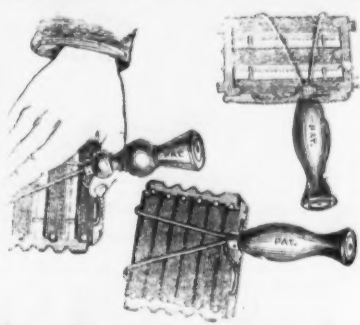
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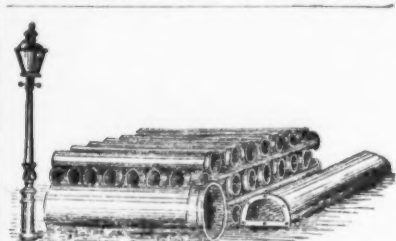
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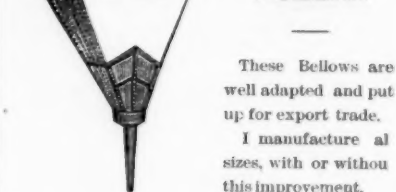
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106, 108 & 110 Centre Street,
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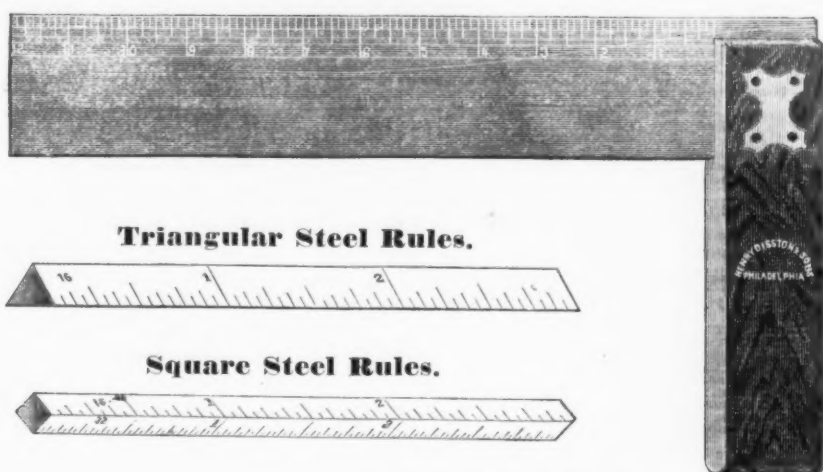
Keystone Saw, Tool, Steel & File Works.

FRONT AND LAUREL STREETS, PHILADELPHIA.

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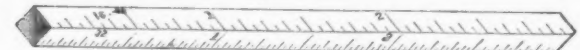
Try Square.



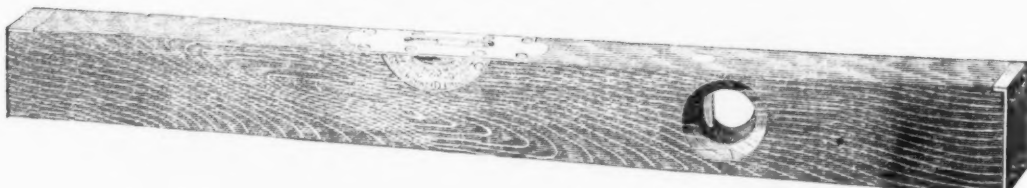
Triangular Steel Rules.



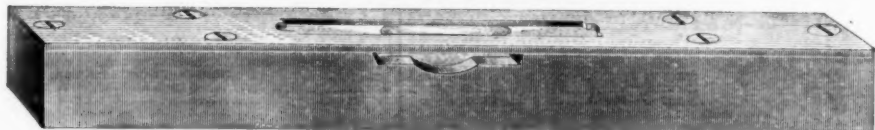
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Plumb and Levels.



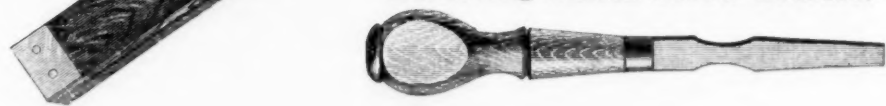
Machinists' Levels.



Bevels.



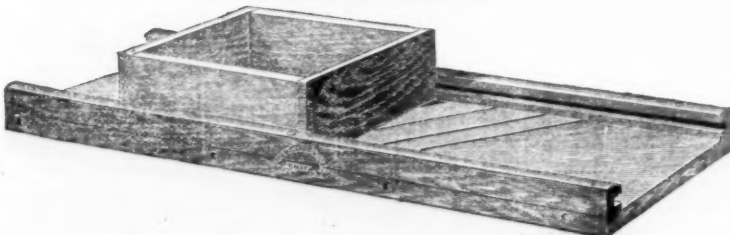
Revolving Shield Screw-Drivers.



The Excelsior Wrench and Screw-Driver.



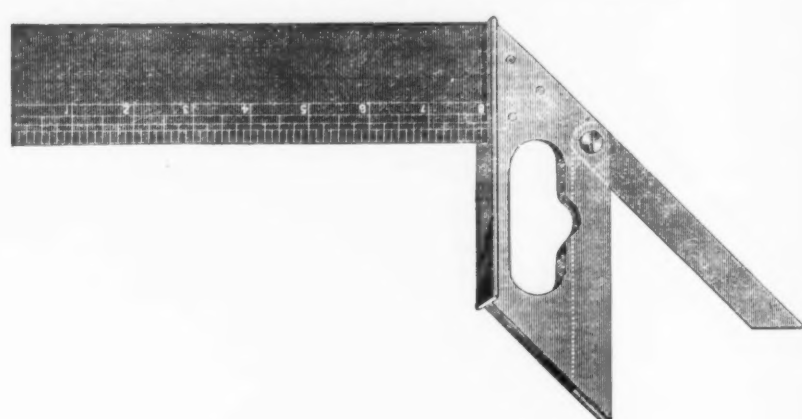
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Gauges.



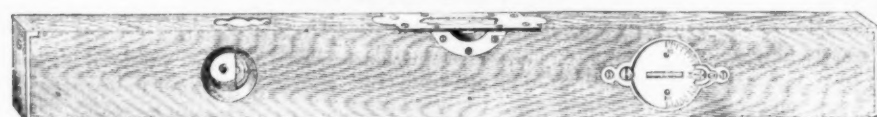
Improved Iron Frame Mitre and Square.



Machinists' Standard Steel Rules.



Graduating Level.



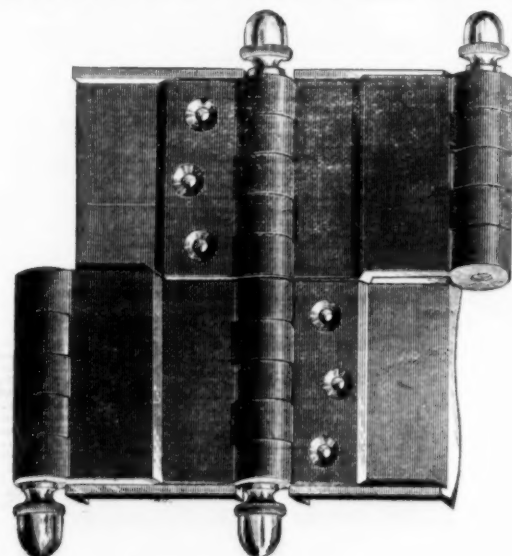
Graduated Steel Squares for Machinists' Use, Graduated to 1-32 of an inch.



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[illegible]

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Nos. 872 to 876.....dis 20 1/2
Nos. 878 to 882.....dis 20 1/2
Nos. 884 to 888.....dis 20 1/2
Nos. 890 to 894.....dis 20 1/2
Nos. 896 to 900.....dis 20 1/2
Nos. 902 to 906.....dis 20 1/2
Nos. 908 to 912.....dis 20 1/2
Nos. 914 to 918.....dis 20 1/2
Nos. 920 to 924.....dis 20 1/2
Nos. 926 to 930.....dis 20 1/2
Nos. 932 to 936.....dis 20 1/2
Nos. 938 to 942.....dis 20 1/2
Nos. 944 to 948.....dis 20 1/2
Nos. 950 to 954.....dis 20 1/2
Nos. 956 to 960.....dis 20 1/2
Nos. 962 to 966.....dis 20 1/2
Nos. 968 to 972.....dis 20 1/2
Nos. 974 to 978.....dis 20 1/2
Nos. 980 to 984.....dis 20 1/2
Nos. 986 to 990.....dis 20 1/2
Nos. 992 to 996.....dis 20 1/2
Nos. 998 to 1000.....dis 20 1/2

Wire.
List of Jan. 1, 1878.....dis 20 1/2
Nos. 10 to 18.....dis 20 1/2
Nos. 20 to 24.....dis 20 1/2
Nos. 26 to 30.....dis 20 1/2
Nos. 32 to 36.....dis 20 1/2
Nos. 38 to 42.....dis 20 1/2
Nos. 44 to 48.....dis 20 1/2
Nos. 50 to 54.....dis 20 1/2
Nos. 56 to 60.....dis 20 1/2
Nos. 62 to 66.....dis 20 1/2
Nos. 68 to 72.....dis 20 1/2
Nos. 74 to 78.....dis 20 1/2
Nos. 80 to 84.....dis 20 1/2
Nos. 86 to 90.....dis 20 1/2
Nos. 92 to 96.....dis 20 1/2
Nos. 98 to 102.....dis 20 1/2
Nos. 104 to 108.....dis 20 1/2
Nos. 110 to 114.....dis 20 1/2
Nos. 116 to 120.....dis 20 1/2
Nos. 122 to 126.....dis 20 1/2
Nos. 128 to 132.....dis 20 1/2
Nos. 134 to 138.....dis 20 1/2
Nos. 140 to 144.....dis 20 1/2
Nos. 146 to 150.....dis 20 1/2
Nos. 152 to 156.....dis 20 1/2
Nos. 158 to 162.....dis 20 1/2
Nos. 164 to 168.....dis 20 1/2
Nos. 170 to 174.....dis 20 1/2
Nos. 176 to 180.....dis 20 1/2
Nos. 182 to 186.....dis 20 1/2
Nos. 188 to 192.....dis 20 1/2
Nos. 194 to 198.....dis 20 1/2
Nos. 200 to 204.....dis 20 1/2
Nos. 206 to 210.....dis 20 1/2
Nos. 212 to 216.....dis 20 1/2
Nos. 218 to 222.....dis 20 1/2
Nos. 224 to 228.....dis 20 1/2
Nos. 230 to 234.....dis 20 1/2
Nos. 236 to 240.....dis 20 1/2
Nos. 242 to 246.....dis 20 1/2
Nos. 248 to 252.....dis 20 1/2
Nos. 254 to 258.....dis 20 1/2
Nos. 260 to 264.....dis 20 1/2
Nos. 266 to 270.....dis 20 1/2
Nos. 272 to 276.....dis 20 1/2
Nos. 278 to 282.....dis 20 1/2
Nos. 284 to 288.....dis 20 1/2
Nos. 290 to 294.....dis 20 1/2
Nos. 296 to 300.....dis 20 1/2
Nos. 302 to 306.....dis 20 1/2
Nos. 308 to 312.....dis 20 1/2
Nos. 314 to 318.....dis 20 1/2
Nos. 320 to 324.....dis 20 1/2
Nos. 326 to 330.....dis 20 1/2
Nos.

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R. H. WOLFF & CO.,

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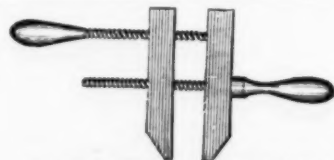
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SINGLE JOINT HINGES.

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	BRASS.	NICKEL PLATED.	BRASS.	NICKEL PLATED.
2½ inch.	\$ 3 00	\$ 4 50	\$ 5 00	\$ 6 50
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4½x4½ inch.	18 00	23 00	21 00	26 00

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2½ inch.	\$ 6 60	\$ 9 00	\$11 50	\$14 25
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5 "	16 50	21 00	21 50	26 00

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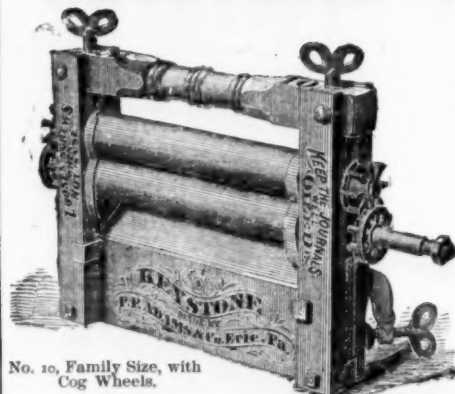
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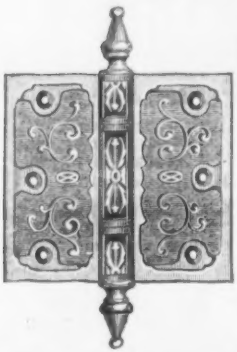
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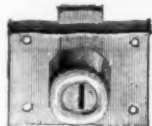
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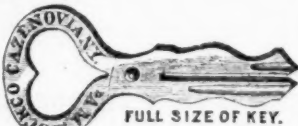
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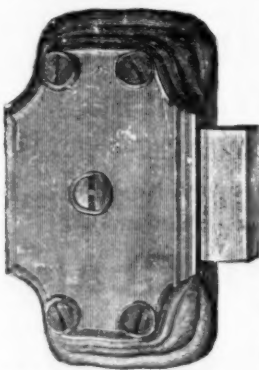


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That will not corrode or wear, and are
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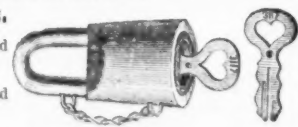


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Upright Rim Dead Locks,
Horizontal Rim Night Latches,
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Fronts and Knobs,
Brass Chest, Box, Cupboard and
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Mica of the Best Quality,

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THE GENUINE

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Our goods have been very
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shown in the cut, which makes
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Which cannot be forced back
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FOR
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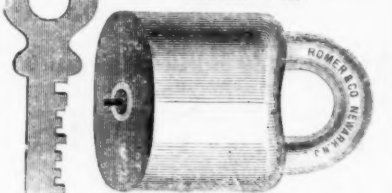
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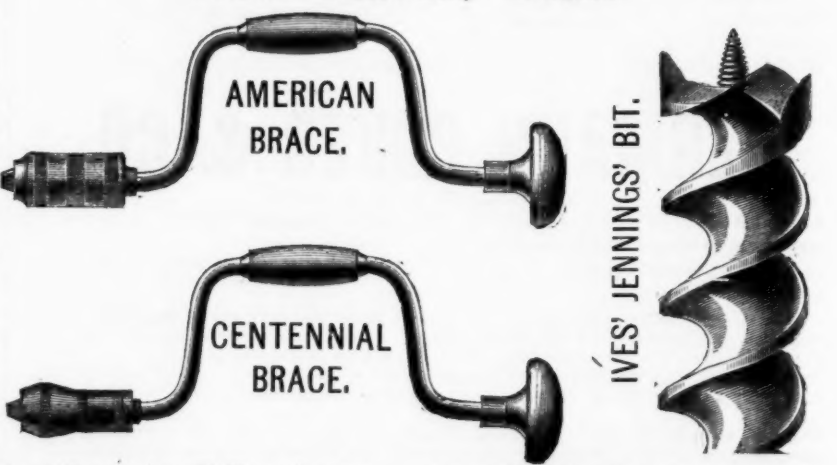
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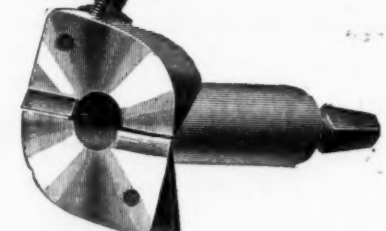
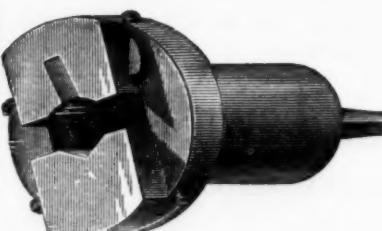
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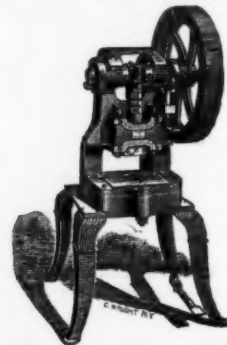
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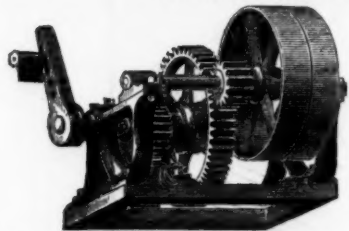
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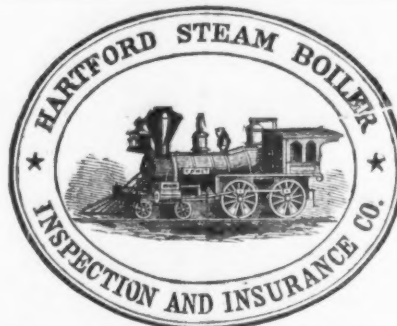
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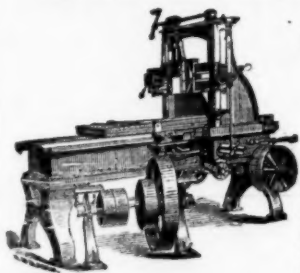
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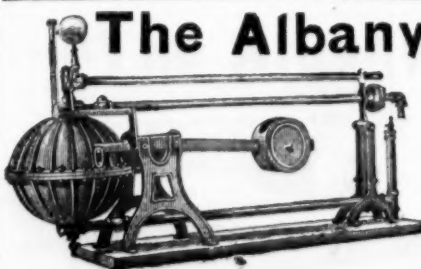
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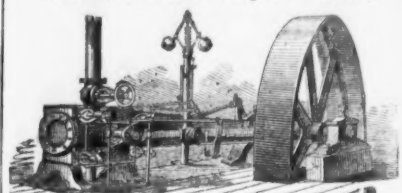
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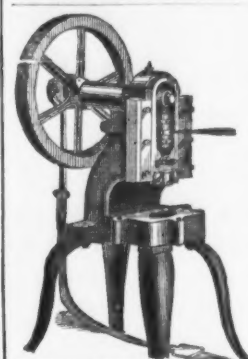
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This Trap automatically drains the water of
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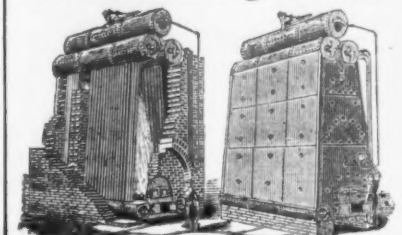
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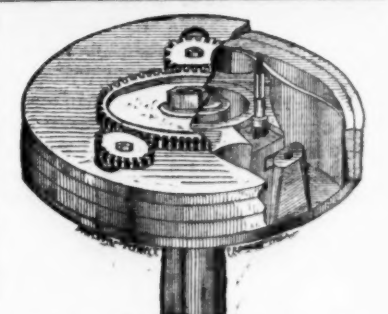
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XXX Genuine.....	35c	C.....	17c
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TUBULAR LANTERNS,
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4, 5 and 6 fingers.
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FRICITION CLUTCHES

For connecting Shafting and Gearing.

Hoisting Machinery & Elevators, Shafting, Hangers and Gearing.

Lafayette Street, PROVIDENCE, R. I.

See cut of Elevator Hoisting Machine in issue of June 20, 1878, PAGE 40.

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Manufacturer of

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Will cut faster, wear longer, and clog less than any file in market.

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Carriage Bolts made from Best Square Iron, a Specialty.

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E. M. BOYNTON,

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First-Class Saws, Saw Frames, Cross-Cut Handles, Tools, Files, &c. Also Sole Proprietor and Manufacturer of the Genuine Patent Lightning Saw.

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TRIAL OF THE IMPROVED LIGHTNING SAW.

The Emperor Dom Pedro, accompanied by Director General Goshorn, Superintendent Albert, and others, visited Machinery Hall, at the Centennial on the evening of June 28th. Among other things inspected, at the invitation of E. M. BOYNTON, of New York, they witnessed a trial of the New Lightning Saw, patented March 26, 1876. Two men, with one of these saws, cut off a sound log of gum-wood, one foot extreme diameter, in seven seconds, or at the rate of a cord of wood in five minutes. Messrs. Corliss, Morell, Lynch, and other members of the commission, witnessed the trial and timed the cutting. The Emperor remarked, That was fast, very fast cutting. Last evening the Emperor made another examination of the saw.—Philadelphia Press, June 30.

"BOYNTON'S SAWS were effectually tested before the judges at the Philadelphia Fair, July 6th and 7th. An ash log, eleven inches in diameter, was sawed off, with a four-and-a-half-foot lightning cross-cut, by two men, in precisely six seconds as timed by the chairman of the Centennial Judges of Class Fifteen. The speed is unprecedented, and would cut a cord of wood in four minutes. The representatives of Russia, Austria, France, Italy, Spain, Belgium, Sweden, England, and several other countries, were present, and expressed their high appreciation."

Received Medal and Highest Award of Centennial World's Fair, 1876.

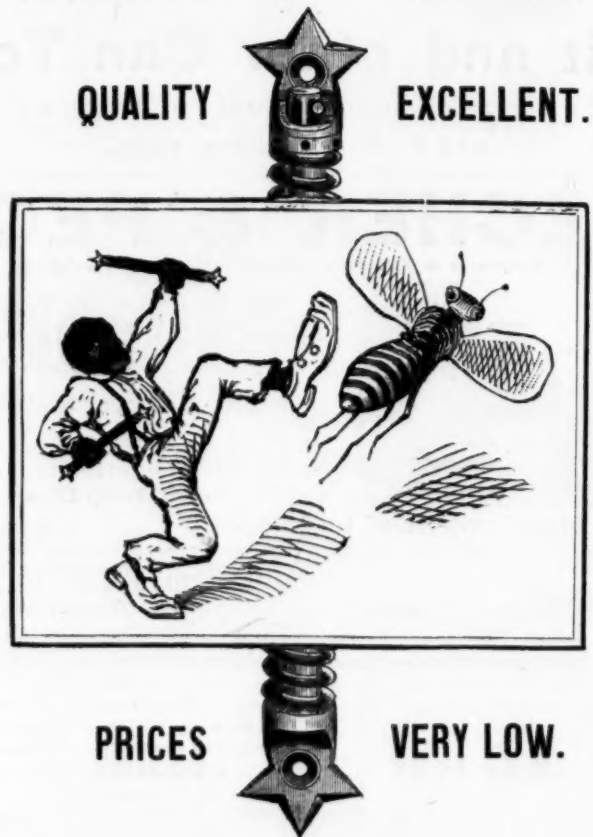
\$1000 Challenge was prominently displayed for six months, and the numerous saw manufacturers of the world dared not accept it, or test in a competition so hopeless.

"SHOO-FLY"

Screen Door Springs,

QUALITY

EXCELLENT.



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VERY LOW.

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MANUFACTURERS,

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